Service Manual

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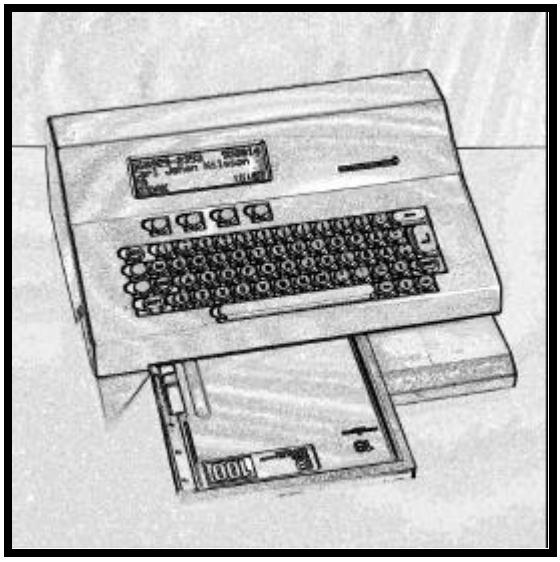

KODAK
Network ID Camera

Health Imaging

CAUTION

This equipment includes parts and assemblies sensitive to damage from electrostatic discharge. Use caution to prevent damage during all service procedures.

Please Note

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1 General information

1.1 ESD

CAUTION

This equipment includes parts and assemblies sensitive to damage from electrostatic discharge. Use caution to prevent damage during all service procedures.

1.2 Overview

Electrostatic discharge (ESD) is a primary source of

- Product downtime
- Lost productivity
- Costly repair

While we cannot feel a static charge of less than 3,500 volts, as few as 30 volts can damage or destroy essential component in the electronic equipment. As technology advance, these components will be even more vulnerable to ESD destruction.

Therefore, to maintain and increase productivity and profitability, you must observe ESD guidelines.

Effective ESD control requires the following things.

1.3 Awareness

Everyone in your organization should be aware of ESD because partial ESD control is no ESD control at all.

Everyone needs to remember that:

- ESD is a primary source of equipment failures and intermittent malfunctions.
- ESD affects productivity and profitability
- ESD can be controlled

1.4 Action

Everyone from senior management to be evening security crew must observe ESD guidelines.

- If you repair and maintain electronic equipment, always wear grounding straps and work at ESD protected sites.
- If you work around electronic equipment, keep static generators like plastic trash bags away from sensitive components.
- Observe ESD guidelines every day. (See the following sections for special tips).
- Remember, effective ESD control is everyone's responsibility.

1.5 Every day

- Keep trash away from static-sensitive equipment. Plastic materials, such as trash can liners and plastic foam cups, generate the static electricity that damages or destroys electronic components.
- Look at the label. Static-sensitive components are marked with bright graphic labels. Follow the label directions.
- Spray the carpet. ESD that is generated when you walk over carpet is a major cause of component destruction. In some cases, especially in low-humidity environments, you may need to periodically spray the carpets with an anti static spray that is available at local stores.

1.6 During maintenance.

- Wear a ground strap when you work with static-sensitive components. Always make certain that the clip is attached to a properly grounded, unpainted surface.
- Use a portable ground mat if you cannot repair components at an ESD protected workstation. (Kodak's Customer Equipment Service Division can help you in set up ESD-protected workstation).
- Use protective packaging when you transport components from one are to another. Transparent antistatic bags, available from a variety of manufacturers, shield the components from future damage.

1.7 Service tools

Use the following tools to repair a KODAK Network ID camera:

Philip Screw Driver size PH2
TORX Screw Driver size 10
TORX Screw Driver size 20
Socket head cap screwdriver 2.0 mm
Box socket wrench 8.0 mm

Digital Multimeter:	Voltage 5 to 24V Resistance 0 to 100 ohm
Lubrication:	Grease Shell Alvia EP 0 Is available as a spare part. Part number T801001.
Glue	Primer, Loctite 770 Polyolefin Glue, Loctite 406 Cyanoacrylate
Nut retention	Loctite 243

To update the firmware or upload or download set-up computer equipment is needed:

Service Computer:	100% IBM compatible Harddisc CGA/EGA/VGA Monitor display 1 RS 232 Serial Interface 1 1.44 Mb Floppy Disk Drive 1 9pin male-female Serial Interface Cable
Service Software:	KNIC software kit. Needed to upgrade the firmware and to upload and download the set-up. The software kit has tool number 005233T2.

1.8 Safety precautions

1. Do not operate or repair the ID camera without proper accessories. Add all COVERS before use to prevent mechanical hazards and electrical shock.
2. Do not use a damaged POWER CORD. The damaged CORD can cause malfunctions and current leakage or electrical shock.
3. If there are any abnormal smell or smoke during operation, de-energize the ID camera immediately and contact authorized personnel for support.
4. Do not operate the ID camera in unsafe locations such as outdoors or in wet places. Do not allow liquids, gaseous or solid-state materials to enter the ID camera.
5. When doing electrical measurements, use an isolation transformer or leakage current detector in the power line to avoid en electrical shock.
6. Use only original parts from the Parts List to repair the ID camera.

Make sure that the requirements of UL 122 - Splice and Connection - paragraph 13.10 and EN 60 950, section 4.39 are observed. When replacing AC primary components, such as wires, sockets or capacitors, wrap the end of the wire completely around the terminal before soldering.

1.9 Introduction

The Kodak Network ID camera is a new XRAY film marking equipment that uses the latest mechanical and electronic technology.

The camera is modular designed and equipped with a modern 16 bit microcontroller. It uses a graphical LCD display, controlled by the micro processor, as the operator display and a graphical VFD display of the same size as the operator display to generate the picture that will be printed on the film. To allow it to communicate with external equipment it is equipped with three serial interfaces. One of these serial channels can also be used to update firmware and to up and download the set-up.

It also features a full 65 key keyboard including four function keys. The layout of the keyboard can be adopted to the national standard of the country where the camera is used.

Service diagnostics is built into the camera and is performed through the operator display and keyboard.

Compliance with European safety regulations has been approved.

All models are presently approved for 220 - 240V, 50 Hz

1.9.1 Camera Models

Features and functions:

Line voltages: 220-240
Line frequency: 50 Hz
Power consumption: 25W, during exposure 35W
Graphical operator display
Full 65 key keyboard that can be adapted to the different standards of the European countries.

1.10 Accessories

Interface cable for connection with Siemens Mammomat® 3000.
Part no: T550024

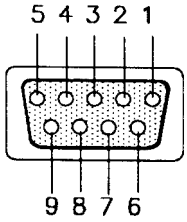
RS232 - RS422 converter
Part no: T256026

1.11 Specification

Electrical supply:	220 -240V 50 Hz
Power consumption:	25W, during exposure 35W
Mains fuse:	2x1 AT
Dimension:	392 x 352 x 153 mm
Weight:	12,6kg
Cassettes:	Kodak X-Omatic cassettes with C-1 and C-1N window all sizes Kodak MIN-R2 cassettes with C-1N window all sizes
Opening Cycle Time:	2s for most films
Operating temperature:	15° - 35° C
Humidity:	20 - 80 % RH non-condensing
Approvals:	EN 60950

1.12 Connectors

HOST and AUX / RS232.

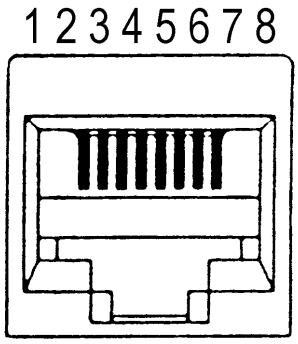


No	Name	Direction
1	DCD	Out
2	RxD	Out
3	TxD	In
4	DTR	In
5	GND	
6	DSR	Out
7	RTS	In
8	CTS	Out
9	RI	Not used

The names in the table shows the names to which pins they should be connected. Thus RxD is an output and TxD is an input.

Pin 1, 6 and pin 9 of the connector is internally connected to +12V through a 3.3k resistor. Additionaly Pin 6 of the AUX connector is connected to +12V through a 100mA fuse located on the adapter board. Pin 8 is driven by a RS232 driver to provide a handshake output signal. Pin 7 is connected to a RS232 receiver to provide a handshake input signal. Whether the handshake is used or not depends on the protocol used. Please refer to the communication chapters for more information. If handshake is not used the output signal is set to high to allow data to be sent even if the sender requires handshake.

NET



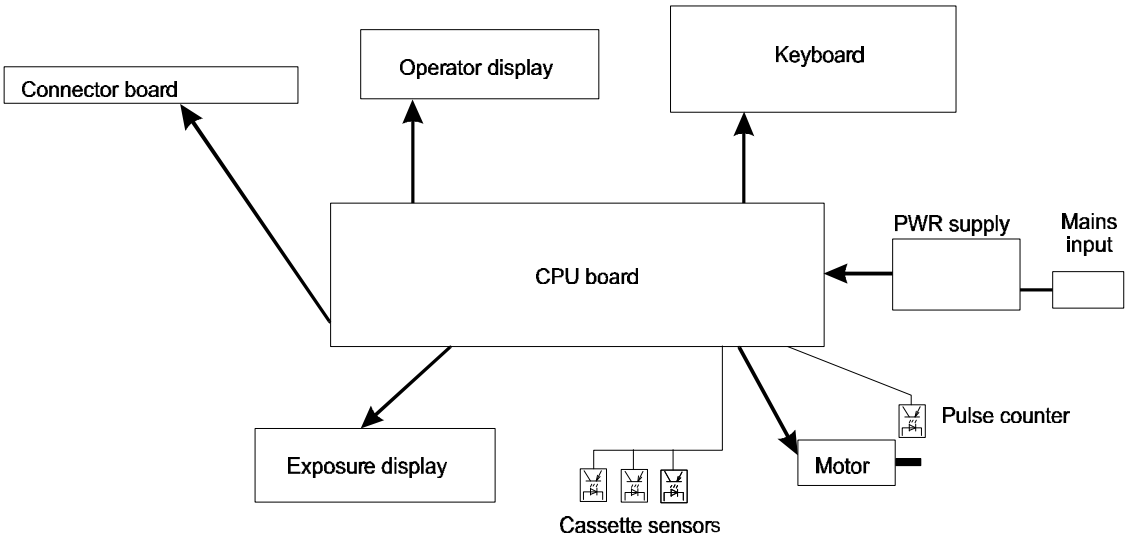
Pin	Used as:	Name
1	+ for the HOST RS-422 output	Network Pair
2	- for the HOST RS-422 output	Network Pair
3	GND	Network ground
4	+ for the HOST RS-422 input and RS485 bi-directional	Network Pair
5	- for the HOST RS-422 input and RS485 bi-directional	Network Pair
6	GND	Network ground
7	- external equipment RS-485	External equipment pair
8	+ external equipment RS-485	External equipment pair

2 Theory guide

2.1 Block diagram

All functions of the ID camera are controlled by the microcontroller on the CPU board.

The controlling firmware is stored in a 256K FLASH memory. All inputs, outputs and drivers for the motor are located on the CPU board. The CPU board is connected to the operator display, exposure display, keyboard, motor sensors and connector board for the external connectors at the back of the ID camera.



Block diagram of KODAK Network ID Camera

2.2 Description of functions

2.2.1 Powersupply system.

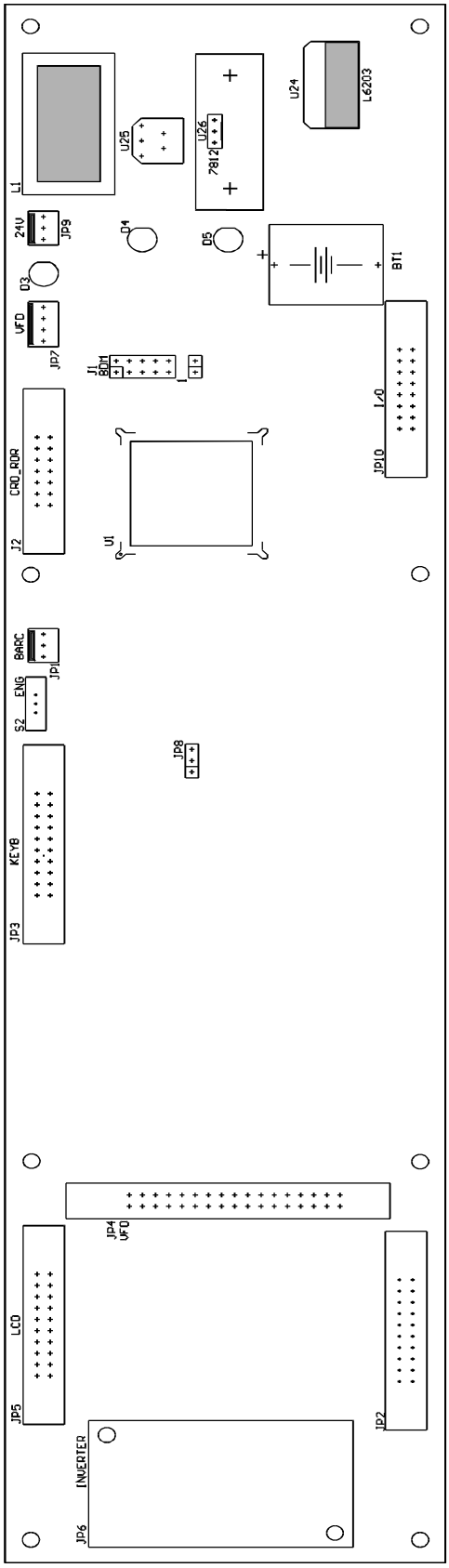
The power system of the ID camera consists of:

- A mains input module featuring a mains cord connector built together with a mains filter and a fuse holder.
- A mains switch mounted at the back of the camera.
- A switched power supply delivering 24V/50W.

2.2.2 CPU board.

The CPU board features:

- A 16 bit microcontroller. Motorola 68HC16.
- 256K of FLASH memory where the program is stored. 16K is used to store a bootstrap program used to download the main program and 16K is used to store the set-up of the camera.
- 128K battery backed-up RAM memory used to store data while operating.
- A switched power converter for converting the 24V supply voltage to 5V and a linear 12 power converter to generate 12V for the exposure display. The operator and exposure displays are driven from the power unit of this board.
- A high voltage converter, called inverter, for the background light of the operator display. This is a separate board mounted on top of the CPU board on the left side
- A RS232 driver for two serial channels.
- A isolated RS422/485 driver. The isolation voltage is 1000Vrms.



The CPU board is the board controlling all functions of the ID camera. The following units are connected to this board.

JP1 Barcode reader connector.

JP2 Magnetic card reader.

JP3 Keyboard

JP4 The data channel of the exposure display

JP5 The data channel of the operator display.

JP6 The power to the back-light of the operator display..

JP7 Power to the exposure display.

JP9 24V power connector to the CPU board.

JP10 Connector for sensors and motor.

The following jumpers, connectors and components are also located on the board

J1 A connector to the background debug channel of the Motorola 68HC16 CPU. Only used during production.

JP8 A jumper used to protect the FLASH memory. Should not be changed, not even when downloading a new program.

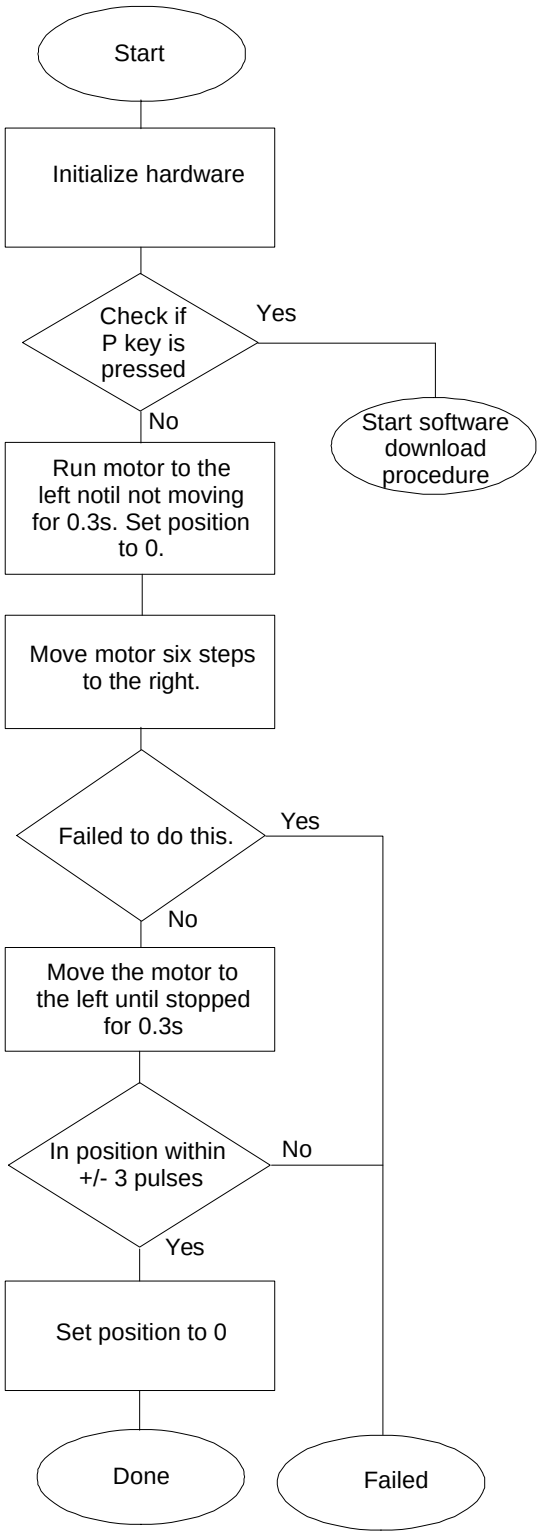
D3 LED. Flashes to tell that the program is running properly.

D4 LED. Not used.

D5 LED. Not used.

BT1 Rechargeable Ni-MH battery for backup of the set-up and real-time clock.

Switch On / Initialize Procedure



Camera status: Mechanic position of the carriage is not known. Camera is energized.

The microprocessor starts the initialization routine. First while still executing the bootstrap program, the P key is checked. If pressed the download procedure will be started.

If not pressed the bootstrap routine will call the main program.

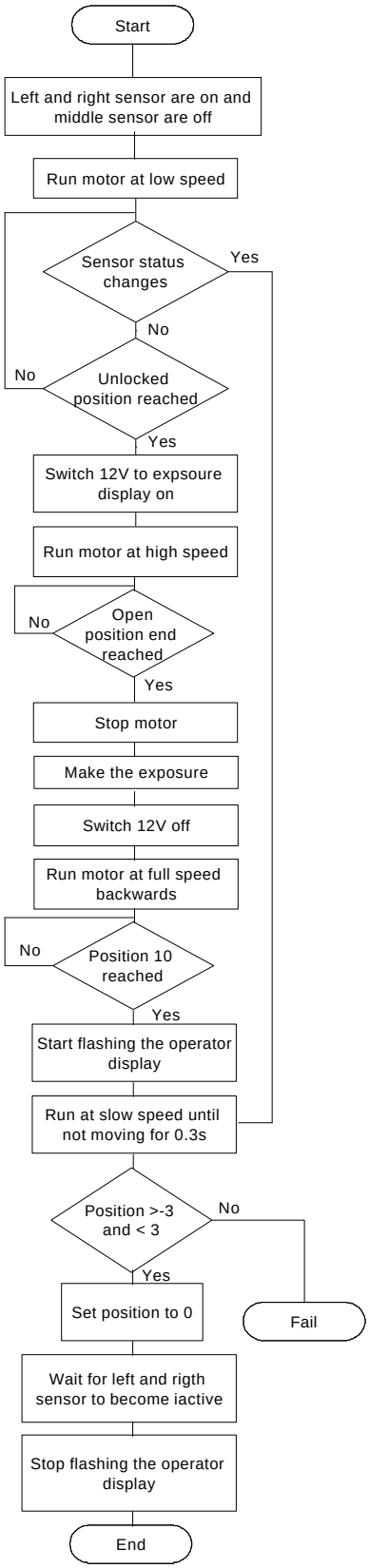
The main program initializes all hardware resources on the CPU board as well as the operator display.

The main program checks if the set-up memory is valid by calculating a check sum. If the check sum does not match the stored value the set-up memory is erased.

The opening unit is run to calibrate the mechanism to find out the left position of the movement area.

If calibration is successful the main picture is displayed and the camera is ready for operation.

2.2.3 Opening sequence.



Camera status: The opening carriage is positioned in its left position.

The sequence is initialized when the left and right cassette sensors are activated while the middle sensor is not.

First the motor is run to the right at a slow speed until the finger of the carriage has entered the hole of the cassette lid and unlocked the lid. At that point the speed of the motor is increased to full speed. The position when this happens is set in the camera firmware and not based on some kind of detection when the lid is really unlocked. At this time the 12V which drives the high voltage generator of the exposure display is switched on.

The motor is run at full speed until the position where the lid is considered opened. Also this position is set by firmware in the camera. At this position the motor is stopped.

The exposure is made by setting the intensity of the exposure display. When the exposure is done the intensity is set to 0 and the 12V is switched off.

The motor is now run at full speed towards it's left position until position 10 is reached. At that position the operator display starts flashing and the speed is slowed down, The motor run until no movement is detected for 0.3 seconds.

The motor is now considered being stopped at its left position. The position is now checked. If it is not within -3 to 3 it was not able to reach its left parking position and an error message is generated. If within this range the position is set to 0 and the exposure cycle is finished.

The right and left sensor must both be off before the operator display stops flashing and a new exposure can be made.

During all operations it is checked that the motor is rotating. If no pulses are read from the pulse counter for 0.3s the motor is considered stopped by force and the motor is switched off and an error message generated.

2.2.4 Keyboard.

The keyboard consists of 65 keys placed in a matrix and the decoding is done by the microprocessor on the CPU board. The matrix is oriented in 10 rows and 8 columns. The left and right SHIFT keys and the CTRL key may be pressed together with any other key while all the other keys must be pressed one at the time.

The layout of the keyboard may be changed by replacing the key-caps and selecting the appropriate language in the firmware.

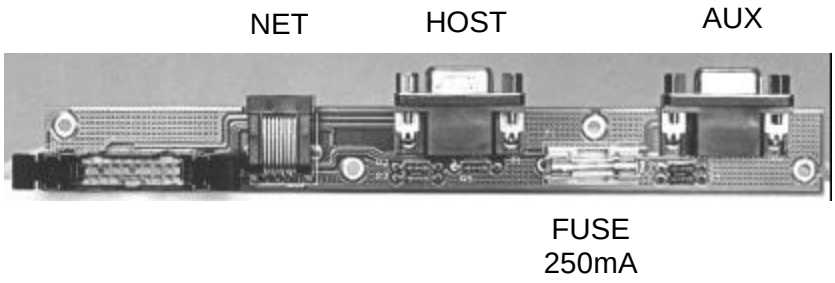
The following languages/Layouts are available:

Belgish, Danish, Dutch, English, Finnish, French, German, Iceland, Italian, Netherlands, Norwegian, Portuguese, Spanish, Swedish, Swiss

See appendix for the keyboard layouts for the respective countries.

2.2.5 Adapter board.

The adapter board is located at the back of the camera. Through this board connection to the three serial channels of Kodak Network ID camera is provided.



The pin-out of the connectors are described in chapter General Information. The fuse on the board is used to connect pin 6/DCD of the AUX connector to +12V. This +12V is used to provide a power source for some low-power unit connected to this connector. The fuse is 250mA.

2.2.6 Operator display.

The operator display is a 240 pixel wide and 64 pixel high graphic liquid crystal display (LCD) display with cold cathode fluorescent lamp back-light. The LCD is controlled by the microprocessor on the CPU board. All characters are generated by the microprocessor and this allows the KODAK Network ID Camera to show any character on the display in any size. Current firmware provides 256 - 32 characters according to ISO 8859-1 in two sizes.

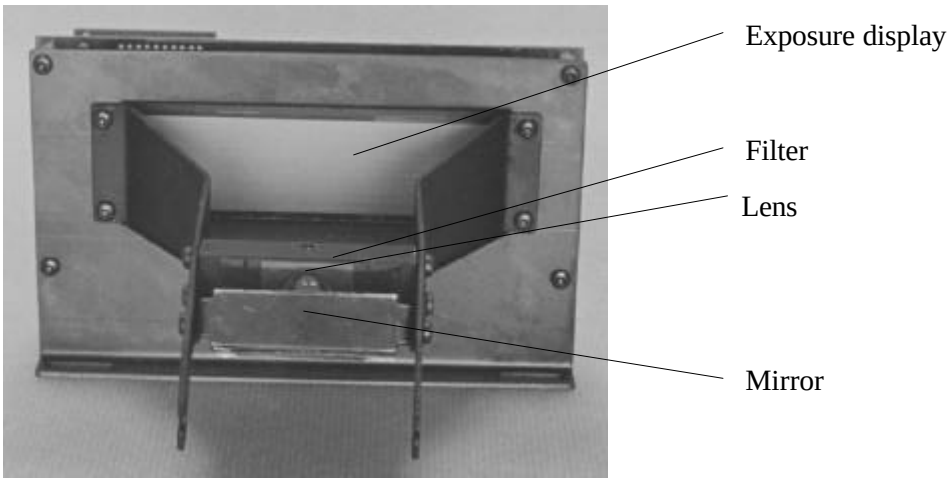
The back-light is driven by a high voltage and the generator (called inverter) that is located as a small separate board on the CPU board. The life-length of the back-light is between 10,000 and 15,000 hours. Life-length is the number of hours the light can be on until the intensity has decreased to half of the initial intensity. The back-light can be replaced separately without replacing the entire LCD module. To extend the life length of

the back-light it will be switched off automatically when the camera has not been used for an hour and will be switched on again as soon as a key on the keyboard is hit. To indicate that the camera is on the CAPS LOCK light on the keyboard will flash when the back-light is switched off.

The LCD display is protected by a acrylic shield that can be replaced separately. It is not a part of the LCD display but inserted between the LCD unit and the case.

2.2.7 Exposure unit.

The main parts of the exposure unit are the display, the lens and a mirror. **NOTE!** If the Network ID Camera has an earlier firmware version than 2.1 the exposure unit has, and should have, a filter mounted on the lensholder between the lens and the mirror. This filter must be removed if firmware version 2.1 or later is used.



The display is used to generate the picture that will be printed on the film. It is a 240 pixel wide and 64 pixel high vacuum fluorescent display (VFD). It is fully graphical which means that any picture can be generated, the picture can be mirrored in any direction and the information can be printed either white on black or black on white.

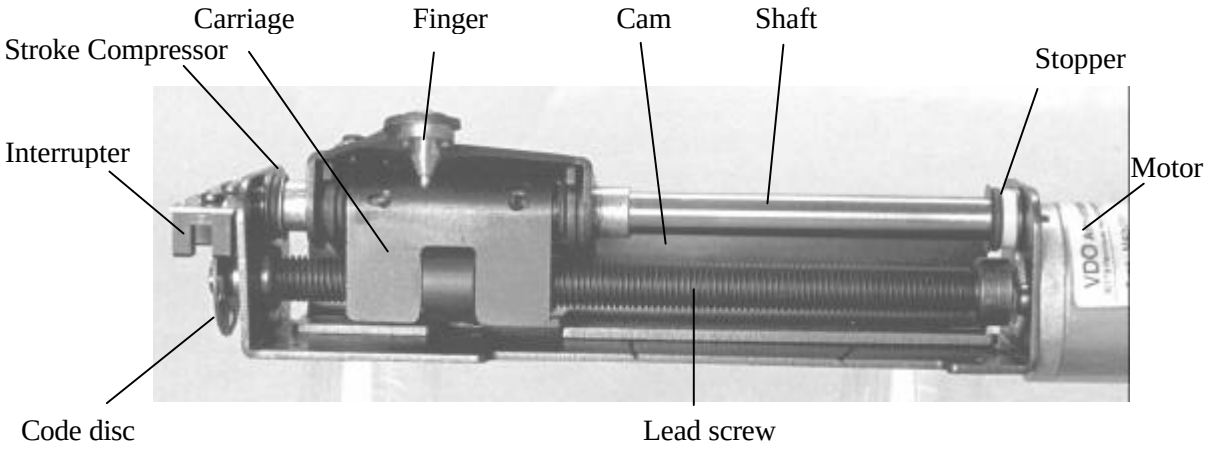
The lens is a specially made for this camera. Both the sides of it has a convex lens and the least convex side should face the display. The size of the picture on the film can be adjusted by moving the lens backwards or forwards. This is though not recommended except in special cases. On the market there are very few cassettes with a window which is shorter then normal. For example there exists a mammography cassette where the window is located on the short side and not on the long which is normal. Because of this there is no room to open the window fully, instead the window is made about 25% shorter. To be able to use this cassette with the KODAK Network ID Camera the lens has to be moved. It may also be necessary to put the lens backwards to decrease the size of the picture even more. When shipped the size and position of the picture is set to work with most cassettes.

The mirror is a surface plated mirror. It should not be polished as this will destroy the silver layer and affect the quality of the picture. The mirror can be moved backwards and

forwards and tilted. It is important to set the angle correct as if the angle is not 45 degrees the picture will be a trapezoid instead of a rectangle.

2.2.8 Opening mechanism.

The opening mechanism consists of a motor driving a screw. This screws drives a carriage which glides on a shaft. The carriage has a finger that unlocks the lid and opens the lid. To do this the finger has to move up and down and this is achieved by a cam on the back of the opening mechanism assembly and a ball-bearing mounted on the back of the carriage which rolls on this cam. On the left side of the opening mechanism assembly there is a code disk mounted on the driving screw and a optical switch which is used as a pulse counter.



The opening sequence is described in chapter 2.2.3 and will not be repeated here.

The optical switch board mounted on the left side of the assembly can be sledded backwards and forwards to adjust the cassette sensing point. This adjustment is described in the **Diagnostic** chapter. There is no need for any adjustment for the pulse counter.

The only adjustment on the opening mechanism is the position on the cam. The cam can be sledded sidewise to adjust the position when the finger goes down in the lid to unlock it. If this position is set too far to the right the lid may not lock when closing the lid. If the position is set too far to the left the finger may hit the edge of the window. When doing the adjustment it is a good idea to gently press the finger down to get the play in its down position and then move the carriage manually by rotating the screw. Also the setting should be checked with all cassette types used. When the setting is correct, rotate the screw by hand through the phase where the finger goes down and while doing so, push the finger gently upwards go get the play in the upper position. This should be done to check that the carriage can in no way hit the exposure unit.

In the finger there is a pin. There are two kinds of lids on the cassette types the KODAK Network ID Camera can work with. One is made of metal with a metal locking mechanism. This lid is used on all or many of Kodak's, Fuji's and Dupont's cassettes. The other is made of plastic with a plastic locking mechanism. The problem is that the plastic lid is more then 1mm thicker then the metal lid which means that the finger has to reach 1mm deeper when the plastic lid is used. Using such a long finger with the metal lid will

wear out the spring of the metal lids. The problem is solved by using a spring loaded pin in the finger. The strength of the spring is such that when the metal lid with it's metal locking mechanism the locking mechanism will be able to push the pin upwards but when the plastic lid is used with its weaker locking mechanism the pin will not be pushed upwards and thus will be able to unlock the deeper locking mechanism.

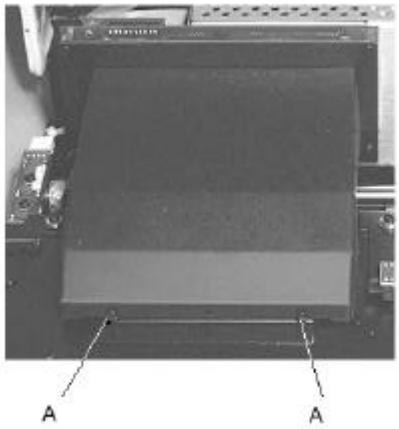
2.2.9 Cassette cover plate sub-assembly.

The cassette cover-plate has three sensors mounted which are used to indicate that the cassette is in position for marking. The left and right sensor are touching the front edge of the cassette while the middle sensor should enter a hole in the cassette. There is a special test mode in the firmware that will display the status of the sensors. The test mode and the adjustment of the sensors are described in a section in the diagnostic chapter.

3 Disassembly/Assembly

The camera is opened by removing two big screws, one on each side, and then flip the case open by pulling the front of the white case upwards.

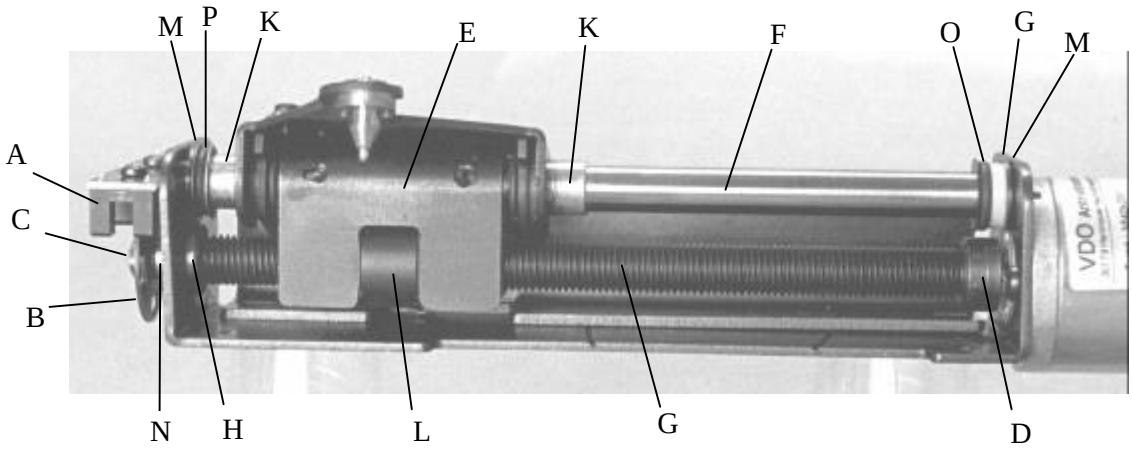
To get a better view of the opening mechanism and the exposure unit the upper baffle can be removed by loosening (not removing) the two screws (A) at the front and then pull upwards at the front of the baffle.



3.1 The opening mechanism.

NOTE 1 From SN:2258 a high precision lead screw with TFE coating including a self-lubricating polyacetal nut is installed. If an old leadscrew, without TFE coating, or old nut, made of brass, is to be exchanged it is necessary to exchange both the lead screw and the nut.

NOTE 2 From SN: 2218 the opening mechanism is equipped with a stopper mounted on the lead shaft. This to avoid stucking of the opening mechanism and therefore not able to remove the cassette. For units with serial number earlier than 2218 is a modification kit available, part number T135000.



Disassembly.

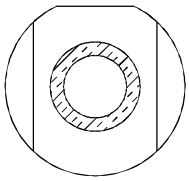
1. Remove the two cables at the back of the exposure unit.
2. Check the position of the exposure unit. It can be sledded sidewise and it will be easier to put it back if we know where it was before. Put a piece of tape on the bottom plate or measure the distance between the left edge of the bottom plate and the exposure unit.
3. Remove the two screws that holds the exposure unit to the bottom plate of the camera.
4. Remove the exposure unit by pulling the back of it upwards/slightly backwards and let it fold until the front is released from the holder.
5. Check the position of the optical switch board. It can be sledded sidewise and it will be easier to put it back if is is known where it was before. Unscrew and remove the optical swich board circuit (A) board to the left of the motor assembly. Let it hang loose in its cables.
6. Move the carriage (E) to the right by turning the lead screw so that the ball bearing at the back of the carriage gets free and the carriage later can be lifted right upwards without any hindrance.
7. Remove the code disk (B), the washer and the distance at the left end of the lead screw by unscrewing the nut (C) on the lead screw. To do this the lead screw has to be held in-place by inserting a socket head cap screwdriver into the screw (D) that holds the lead screw to the motor shaft.
8. Remove the two E-rings (M). Note that the right one is fixed with a screw.
9. Slide the shaft (F) sidewise and remove the stopper (O) and the stroke compressor (P). Pull the shaft out.
10. Now the carriage can be lifted straight upwards and put aside.
11. Remove the lead screw (G) by first un-tighten the screw (D) that holds the lead screw to the motor shaft and then loosen the two screws that hold the motor. Separate the motor from the lead screw by pulling the motor to the right. The lead screw can now be removed. **NOTE!** The ball bearing has a given position and should not be moved unless it is to be exchanged.

The carriage itself should not be disassembled. The two plain bearings (K) are one-time-only and can not be removed and inserted again.

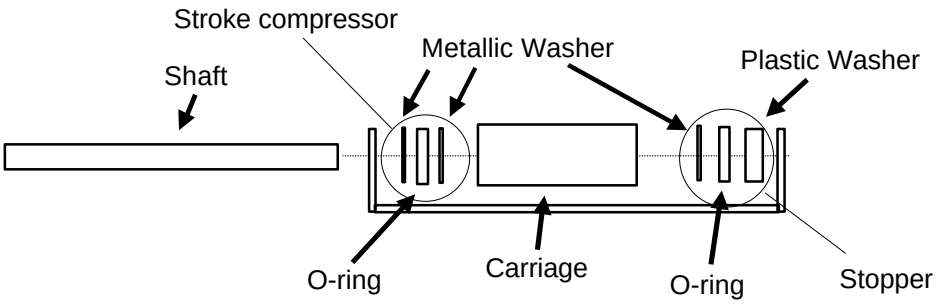
Assembly

1. Slide the lead screw (G) back in the ball bearing (H) and then but the motor back. Push the lead screw (G) over the motor shaft while position the motor. Fix the motor.

1. Position the lead screw sideways against the ball bearing and fix it with the insex screw (D). It is important that the ball bearing (H) is at its given position, if it has been moved it has to be adjusted, see point 7 below.
2. Put the carriage (E) back over the nut (L) on the lead screw. **Note!** If the unit is equipped with an old nut, made in brass, it has to be oriented as on the picture to the right.
3. Put the shaft (F) that holds the carriage back. Make sure that the stroke compressor and the stopper are mounted in right order.



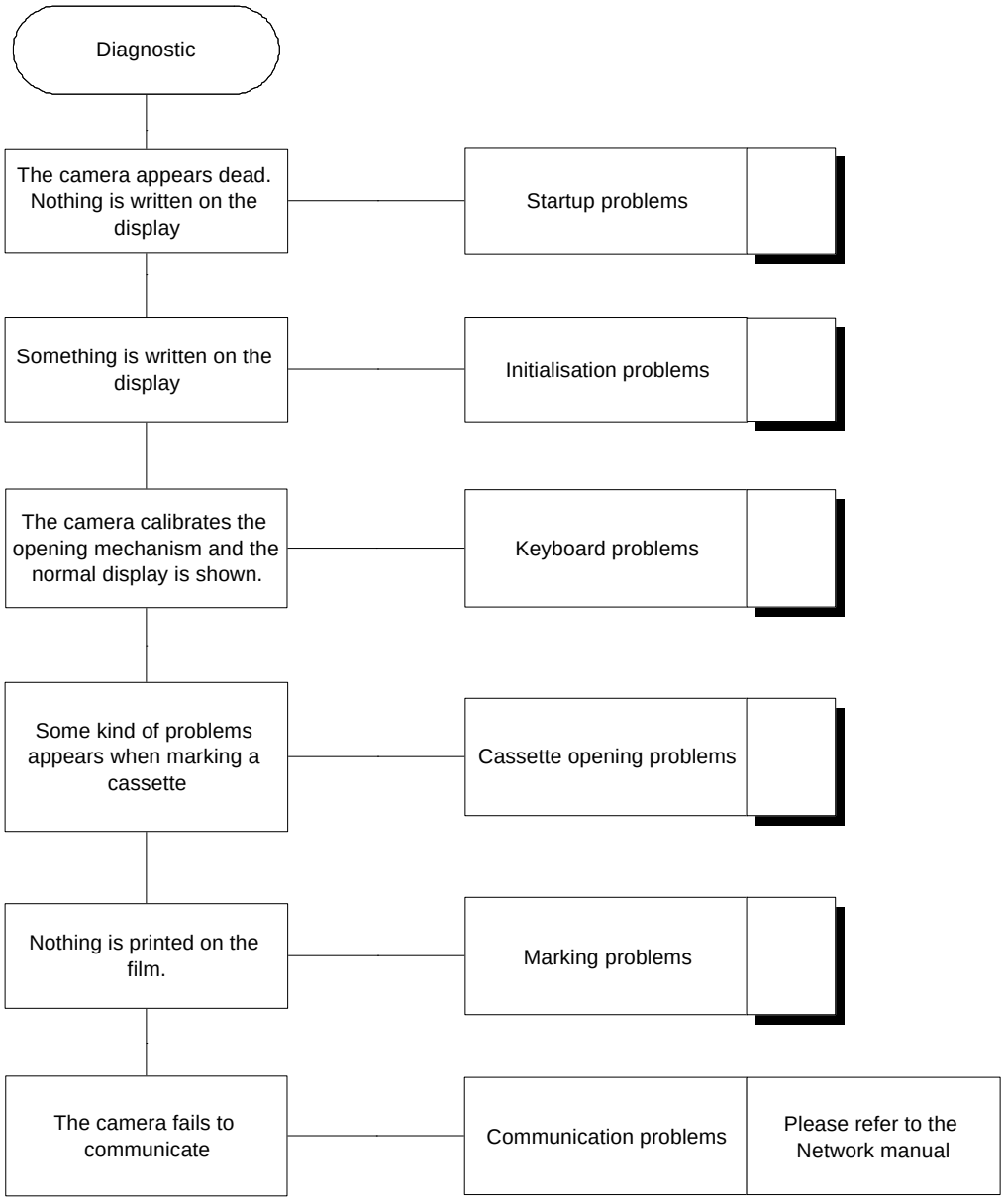
Orientation of the nut.

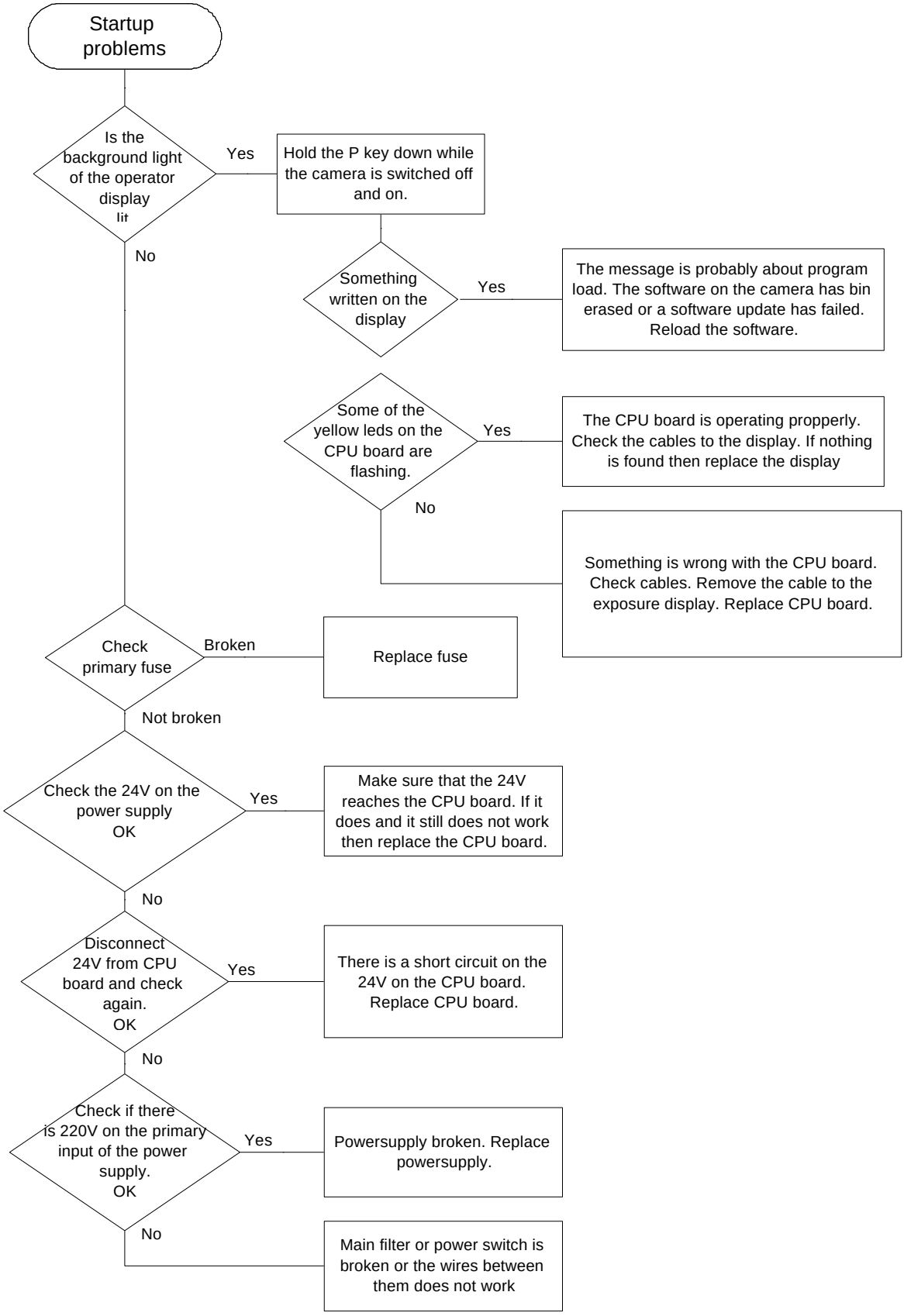


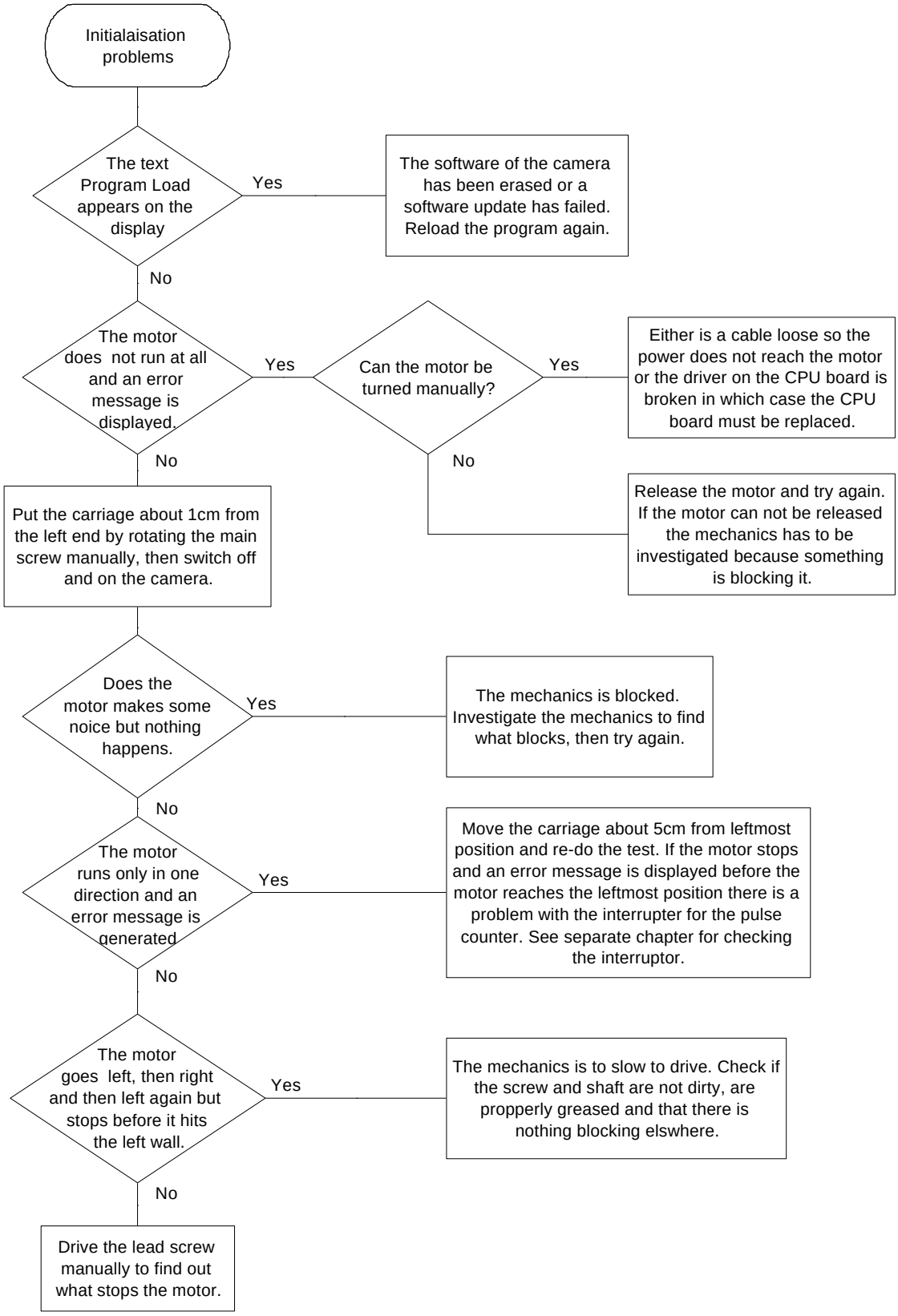
4. Put on the E-rings (M) and fix the right E-ring with the screw.
5. Put the code disk (B) back. First the 5mm thick distance should be applied, then the code disk and finally the nut. The nut must be secured with Loctite 243 or equivalent. **NOTE!** If the unit is equipped with an old lead screw (steel gray - not black plastic) a star washer should be used to secure the nut.
6. The optical switch circuit board (A) is next. It should be fastened with two screws. It need to be calibrated but a good start is if it is put close to it's original position. Most often the position can be seen by the marks the screws make in the board. **NOTE!** It is very important to verify that the sensors goes free from on one hand the ball bearing and the other the code disk. If not, the lead screw must be adusted. This is done by loosen the insex screw (D) and carefully press the lead screw, including the ball bearing, sideways.
7. Put the exposure unit in place. Put it in the position according to point 2 in the disassembly instructions. Its position needs to be calibrated later. If point 2 was ignored make sure that the position is not too far to the left because the carriage may hit the exposure unit during the opening.
8. Now everything is in place. Next step is to adjust the optical switch board. Please refer to the chapter about the sensor adjustment in the diagnostic chapter.

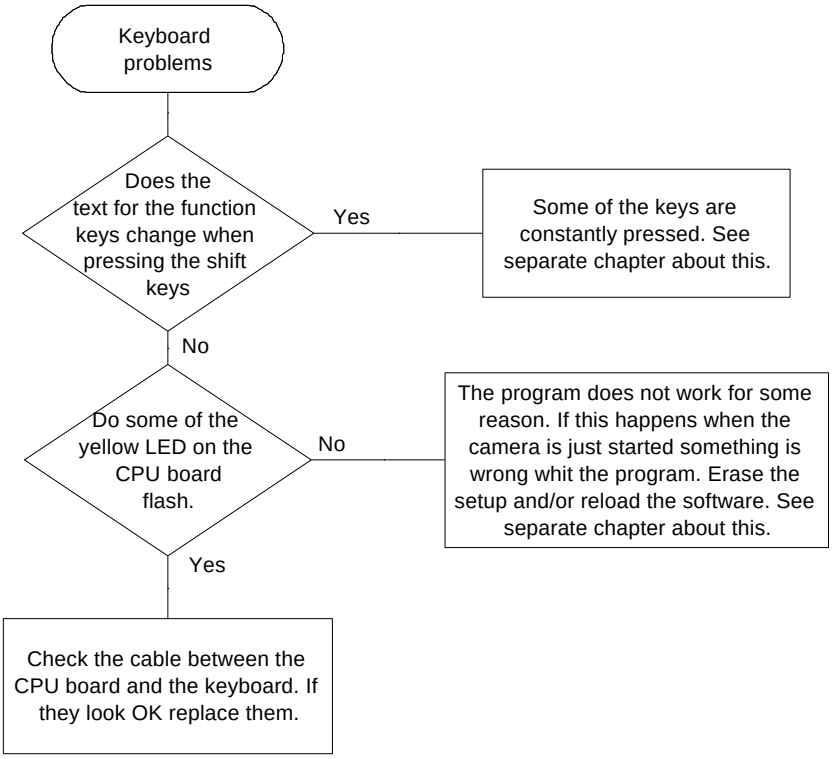
9. Next step is to adjust the position of the exposure unit. How to do this is described in the **Diagnostics** chapter.

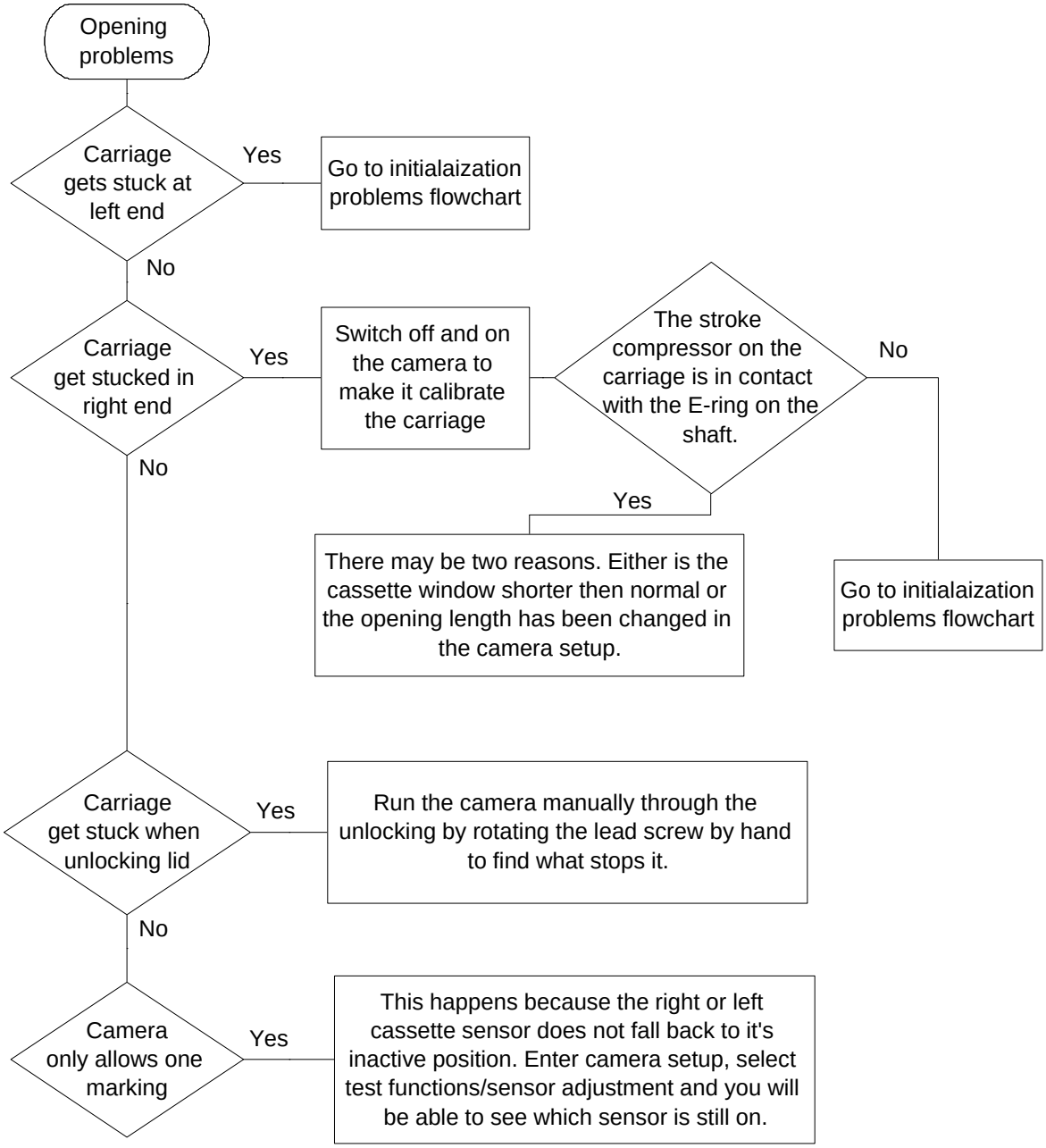
4 Diagnostic

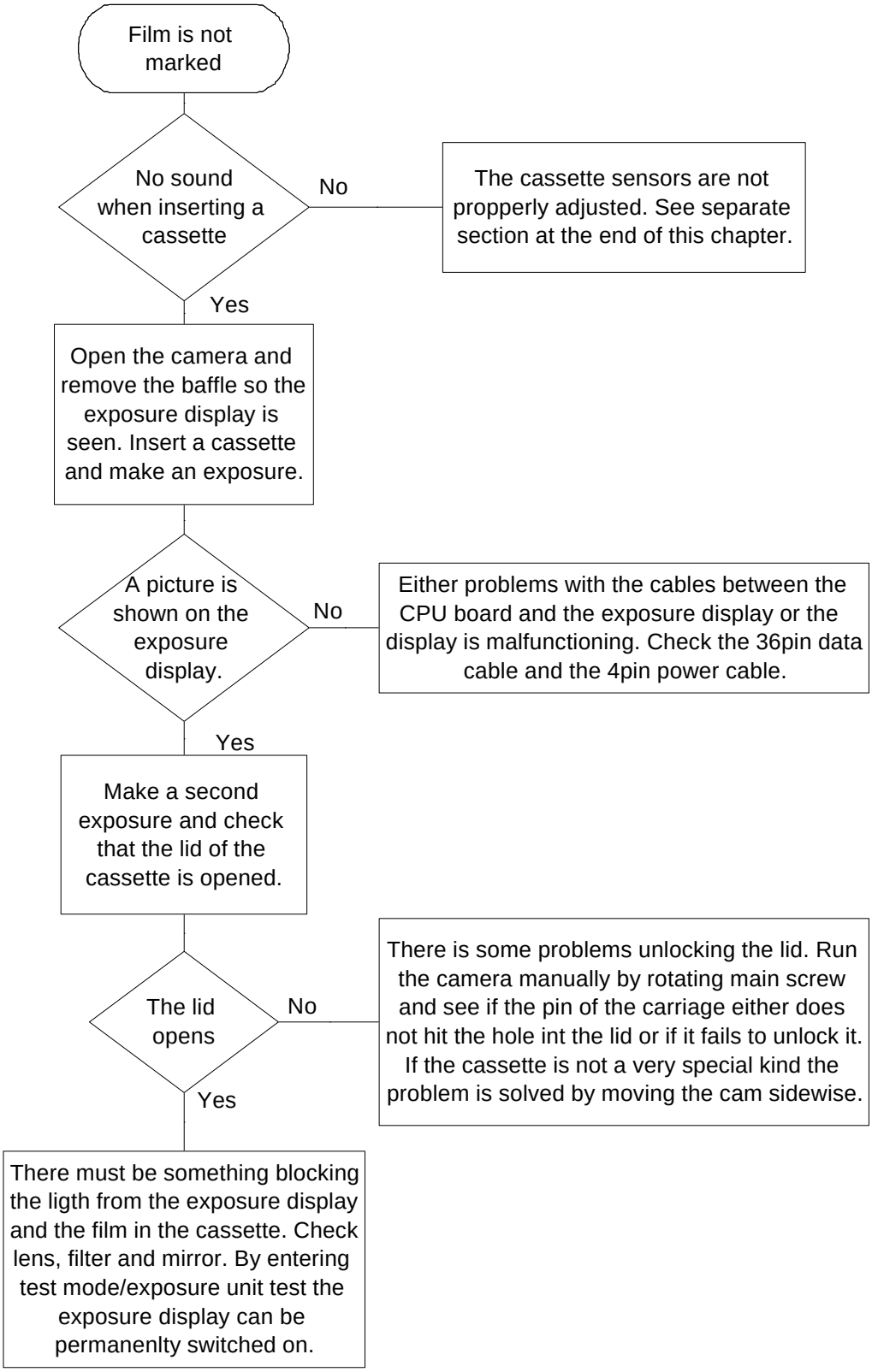



Startup problems
Is the background light of the operator display lit
Yes
Hold the P key down while the camera is switched off and on.
No
Something written on the display
Yes
The message is probably about program load. The software on the camera has bin erased or a software update has failed. Reload the software.
Some of the yellow leds on the CPU board are flashing.
Yes
The CPU board is operating propperly. Check the cables to the display. If nothing is found then replace the display
No
Something is wrong with the CPU board. Check cables. Remove the cable to the exposure display. Replace CPU board.
Check primary fuse
Broken
Replace fuse
Not broken
Check the 24V on the power supply OK
Yes
Make sure that the 24V reaches the CPU board. If it does and it still does not work then replace the CPU board.
No
Disconnect 24V from CPU board and check again. OK
Yes
There is a short circuit on the 24V on the CPU board. Replace CPU board.
No
Check if there is 220V on the primary input of the power supply. OK
Yes
Powersupply broken. Replace powersupply.
No
Main filter or power switch is broken or the wires between them does not work


Initialaisation problems
The text Program Load appears on the display
Yes
The software of the camera has been erased or a software update has failed. Reload the program again.
No
The motor does not run at all and an error message is displayed.
Yes
Can the motor be turned manually?
Yes
Either is a cable loose so the power does not reach the motor or the driver on the CPU board is broken in which case the CPU board must be replaced.
No
No
Release the motor and try again. If the motor can not be released the mechanics has to be investigated because something is blocking it.
Put the carriage about 1cm from the left end by rotating the main screw manually, then switch off and on the camera.
Does the motor makes some noice but nothing happens.
Yes
The mechanics is blocked. Investigate the mechanics to find what blocks, then try again.
No
The motor runs only in one direction and an error message is generated
Yes
Move the carriage about 5cm from leftmost position and re-do the test. If the motor stops and an error message is displayed before the motor reaches the leftmost position there is a problem with the interrupter for the pulse counter. See separate chapter for checking the interruptor.
No
The motor goes left, then right and then left again but stops before it hits the left wall.
Yes
The mechanics is to slow to drive. Check if the screw and shaft are not dirty, are propperly greased and that there is nothing blocking elswhere.
No
Drive the lead screw manually to find out what stops the motor.

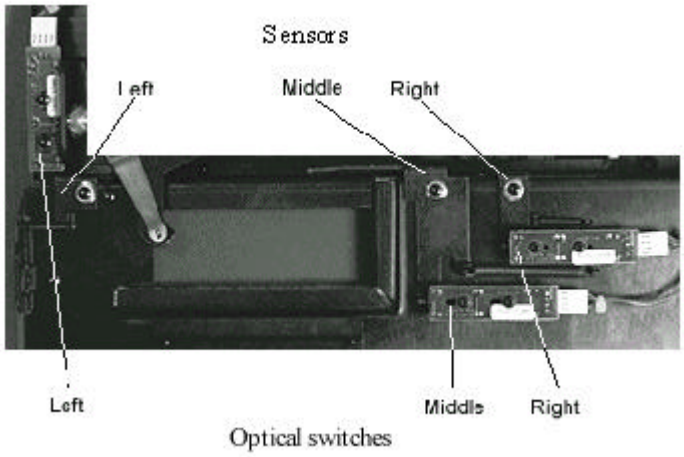

Keyboard problems
Does the text for the function keys change when pressing the shift keys
Yes
Some of the keys are constantly pressed. See separate chapter about this.
No
Do some of the yellow LED on the CPU board flash.
No
The program does not work for some reason. If this happens when the camera is just started something is wrong whit the program. Erase the setup and/or reload the software. See separate chapter about this.
Yes
Check the cable between the CPU board and the keyboard. If they look OK replace them.


Opening problems
Carriage gets stuck at left end
Yes
Go to initialaization problems flowchart
No
Carriage get stucked in right end
Yes
Switch off and on the camera to make it calibrate the carriage
The stroke compressor on the carriage is in contact with the E-ring on the shaft.
No
Yes
There may be two reasons. Either is the cassette window shorter then normal or the opening length has been changed in the camera setup.
Go to initialaization problems flowchart
No
Carriage get stuck when unlocking lid
Yes
Run the camera manually through the unlocking by rotating the lead screw by hand to find what stops it.
No
Camera only allows one marking
Yes
This happens because the right or left cassette sensor does not fall back to it's inactive position. Enter camera setup, select test functions/sensor adjustment and you will be able to see which sensor is still on.


Film is not marked
No sound when inserting a cassette
No
The cassette sensors are not propperly adjusted. See separate section at the end of this chapter.
Yes
Open the camera and remove the baffle so the exposure display is seen. Insert a cassette and make an exposure.
A picture is shown on the exposure display.
No
Either problems with the cables between the CPU board and the exposure display or the display is malfunctioning. Check the 36pin data cable and the 4pin power cable.
Yes
Make a second exposure and check that the lid of the cassette is opened.
The lid opens
No
There is some problems unlocking the lid. Run the camera manually by rotating main screw and see if the pin of the carriage either does not hit the hole int the lid or if it fails to unlock it. If the cassette is not a very special kind the problem is solved by moving the cam sidewise.
Yes
There must be something blocking the ligth from the exposure display and the film in the cassette. Check lens, filter and mirror. By entering test mode/exposure unit test the exposure display can be permanenlty switched on.

4.1 Sensor adjustment

There are three sensors which recognizes when a cassette is inserted for marking.



Optical switches

The left and right sensors senses the front of the cassette. When the cassette is inserted well enough the opening cycle may start. The middle sensor is a pin that should enter a hole in the front side of the cassette. If the cassette is not well pushed towards the left side of the opening of the cassette the pin will hit beside the hole and the middle sensor will be pushed by the cassette and by detecting this the camera knows that the cassette is not properly inserted.

To adjust the cassette, enter the set-up mode of the camera. Select Sensor adjustment. Here a picture is shown showing the status of the three sensors. Note that this picture is also shown on the exposure display so if the baffle over the exposure unit is removed there is no need to look at the operator display to do the adjustment.

When no cassette is inserted all sensors should show OFF. When a cassette is inserted in marking position the left and right sensor should show ON and the middle sensor should show OFF.

Adjusting a sensor is made by loosening the two screws that holds the corresponding optical switch board and then slide the board until it switches between ON and OFF in the appropriate position.

The left sensor should switch to ON when there is about 1.5 mm until the cassette is fully inserted.

The right sensor should switch to ON when there is about 1.5 mm until the cassette is fully inserted ,but this adjustment is not as critical as the left sensor. What is critical is that when both the left and right sensor are both switching to on the hole of the lid in the cassette must be in a position where the pin of the opening carriage will enter the hole. This means that the setting of the left sensor is quite critical. 1 mm here will mean 1 mm in the position of the hole. The right sensor is not so critical,1 mm in her will mean about 1/10 of a mm in the position of the hole.

The middle sensor should be adjusted to switch to ON in the middle of its movement. Take a cassette and insert it but keep it a few centimeters from the left side of the cassette bed so the pin of the middle sensor does not hit the hole in the cassette. Move the cassette in and out to see how much the sensor moves. Find the middle of this

movement, hold the cassette there and adjust the optical switch board so it switches at this position.

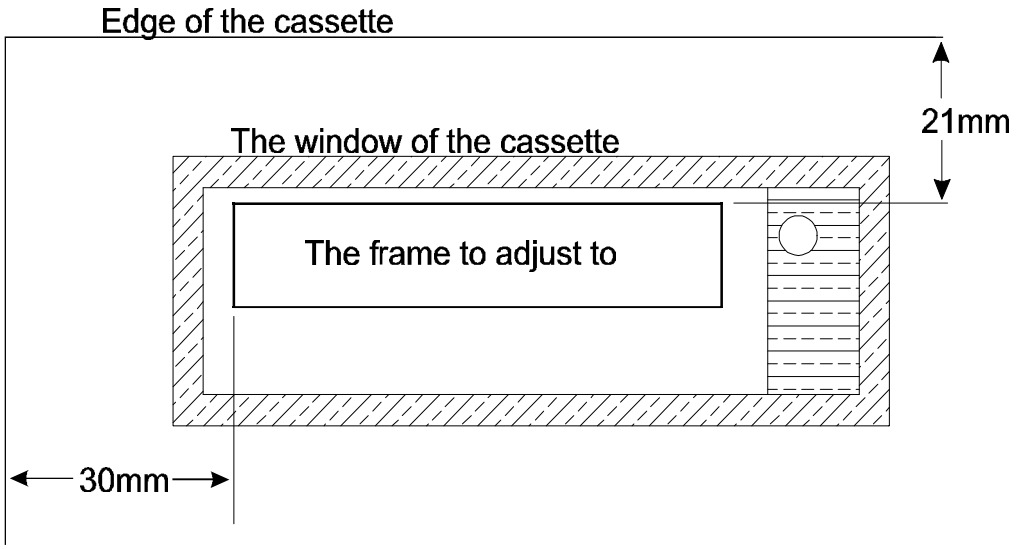
When the two screws holding an optical switch board has been tightened the sensor should be checked once more as the board may move when the screws are tightened.

4.2 Adjusting the exposure unit.

This adjustment must be made if the exposure unit has been moved. First the lens has to be adjusted. By moving the lens backward or forward the size of the picture can be changed. This adjustment only has to be made if the lens has been moved in it's holder. Next is to adjust the mirror and the position of the exposure unit sidewise.

As a help a frame drawn on a paper is needed. This frame should be inserted in an empty cassette and the camera will then be made to present a corresponding frame on the exposure display which will be projected on the paper in the cassette using a special test mode of the camera. The size of the projected frame should then be adjusted to match the frame on the paper.

The size of the frame should be 13mm high and 64mm. You may very well make a copy of the illustration below. Just remember to check that the size after copying is still 13 by 64 mm.

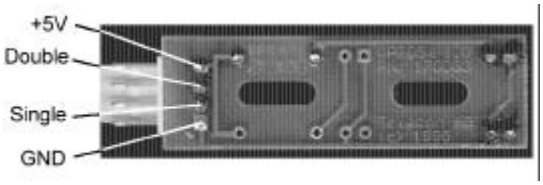


1. Insert the paper with the frame into the cassette as illustrated above.
2. Take the camera somewhere where there is not too much light.
3. Open the camera and remove the baffle that covers the exposure unit by loosening (not removing) the two screws in the front of the baffle. If the exposure unit needs to be adjusted sidewise the two screws that holds the exposure unit to the base plate should be un-tightened.
   WARNING! By doing this you will also remove the cover that protects you from the moving carriage when the camera is operated!
4. Enter set-up mode/test functions. Select test picture Frame C1N.

5. Insert the cassette. Press the Sift-F1/Adjust. The camera will open the cassette and keep it open and display the test picture.
6. Now make the frame displayed on the exposure display show on the paper in the cassette by tilting the mirror and maybe moving the lens.
7. Next adjust the lens so that the size of the frame projected on the paper fits within the frame on the paper. The lines of the projected frame is probably wider then the line on the paper. They should be on or within but not outside the lines on the paper. Adjust the position sidewise by moving the entire exposure unit if necessary. If the picture is trapezoid (sides are not parallel) can be corrected by moving the mirror backwards or forwards in the holes it is mounted in. Just loosen the screws and slide it. If the upper and lower lines are not parallel it is because the left and right side of the mirror are not adjusted properly relative to each other.
8. When the projected frame is rectangular and the size is adjusted to the frame on the paper, tighten the screws that holds the exposure unit to the base plate, tighten the screws that holds the mirror, carefully as the mirror may tilt when doing so. Check that the adjustment is still OK.
9. Press Sift-F1/Adjust again to close the open cassette and to switch the exposure display off. Put the baffle back and tighten the screws that holds it. Close the cover of the camera and mount the two screws that holds the cover.
10. Make an exposure to make sure that everything is OK.

4.3 Checking if an optical switch board works.

Three optical switch boards are used in the camera. Two have one optical switch mounted and one have two optical switch. They are all used for the cassette sensor described in the previous chapter but the board with two optical switch are also used for the pulse counter. The pins in the connector of the optical switch board are used at follows.

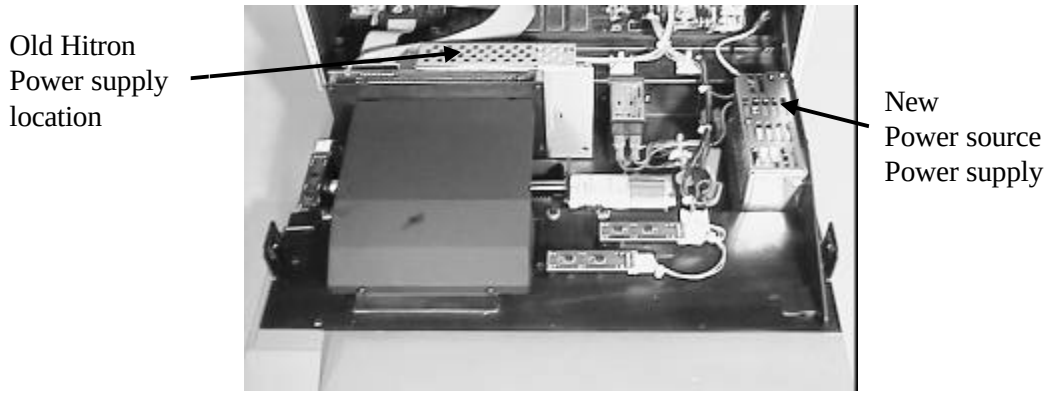


The pin marked single are on all three optical switch boards used to detect the status of the sensors while the pin marked double is used for the pulse counter detector.

When nothing is inserted in the gap of the optical switch the voltage between GND and the output (Double or single) should be less then 0.5V. When something is inserted breaking the light the voltage should be more then 3V. Note that an ordinary paper will not break the light. The IR light will go through the paper. Best to use is a piece of metal, for example a piece of aluminum foil. Also, check the plastic cover of the optic sensors that it is not broken.

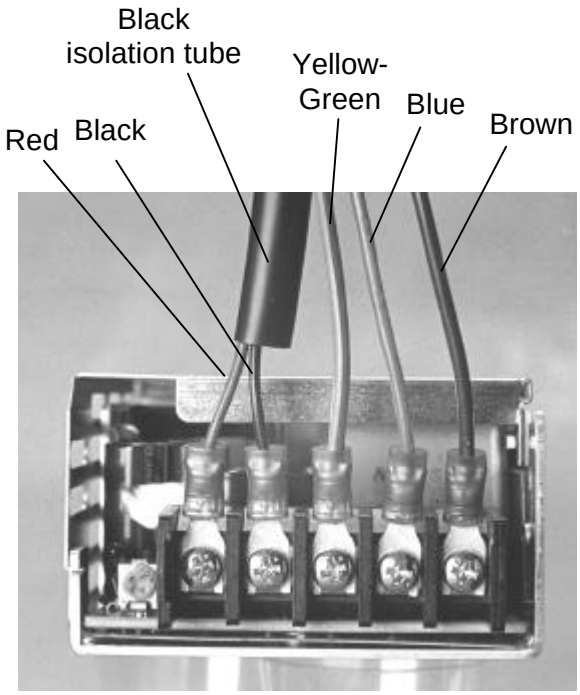
4.4 Replacing the power supply.

NOTE! From SN:2065 a POWER SOURCE power supply is installed. If the power supply is to be exchanged on a unit with the old HITRON power supply, serial number 2064 or earlier, an upgrade kit is required. All necessary parts including a POWER SOURCE power supply is included in the Power supply replacement kit, part number T690010.



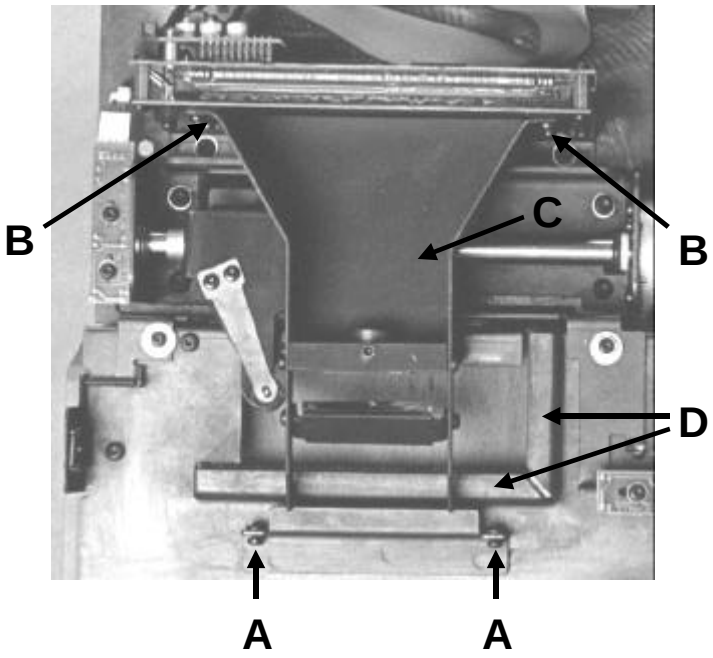
1. Remove the mains connection. When working on the power supply the mains must not be connected.
2. Open the top of the camera according to the description at the beginning of this chapter.
3. The power supply is located at the right side of the camera. It is fastened by two torx M3 screws. They are located on the right side of the power supply, unscrew them.
4. Now swing the power supply into a position where the five screws that holds the power supply connections can be accessed.
5. Disconnect all the wires.

Low Voltage		Line Voltage		
Red	Black	Yellow/Green	Blue	Brown
24VDC	Return	GND	N	L



1. Connect the wires again on the new power supply as illustrated above:
2. Swing the power supply back in position behind the exposure unit.
3. Fasten it with the two M3 torx screws.
4. Switch on the camera and check that the camera initializes.

4.5 Replacing the sealing strips



1. Open the top of the camera according to the description at the beginning of chapter 3.
2. Remove the upper baffle by loosening (not removing) the two screws (A) at the front and then pull upwards at the front of the baffle.
3. Remove the cover (C) of the optical unit by loosen the screws (B), two at each side. If the entire exposure unit is removed it must be adjusted after reinstallation, see chapter 4.2. **NOTE!** The mirror surface should NOT be exposed to any kind of physical contact.
4. Remove the sealing strips (D) fixed from below on the cassette cover sheet. Make sure that the surface is clean from old remains.
5. Apply the new sealing strips. We recommend that Loctite 406 glue together with Loctite 770 primer is used.
6. Reinstall the cover (C). If necessary, clean carefully the display window and the lens using a soft piece of rug and alcohol. **NOTE!** Do not clean the mirror.
7. Put the upper baffle in place and tighten the screws (A).
8. Close the top of the camera.
9. Done.

5 Maintenance

When the camera is operated in a dusty environment it may be necessary to open the camera regularly to clean out the dust.

Cleaning the outside of the camera may be done with a piece of cloth and mild soap.

NOTE! Never use strong chemicals, including alcohol or abrasive to clean the outside of the camera.

5.1 Lubrication

It exists two types of lead screws/nut configurations, one which does not require any lubricated and one type that need lubrication the later is installed on units with SN: 2257 and earlier.

The first one is a lead screw with TFE coating and a self-lubricating polyacetal nut. This configuration shall NOT be lubricated.

The other one, a steel lead screw with a nut of brass, must be lubricated for best performance. This is done at delivery from the factory and normally there should be no need for additional lubrication. Lubrication may be needed if the camera has been used in a very dusty environment or if some parts in the opening mechanism has been replaced.

The following grease should be used.

Shell Alvia EP 0

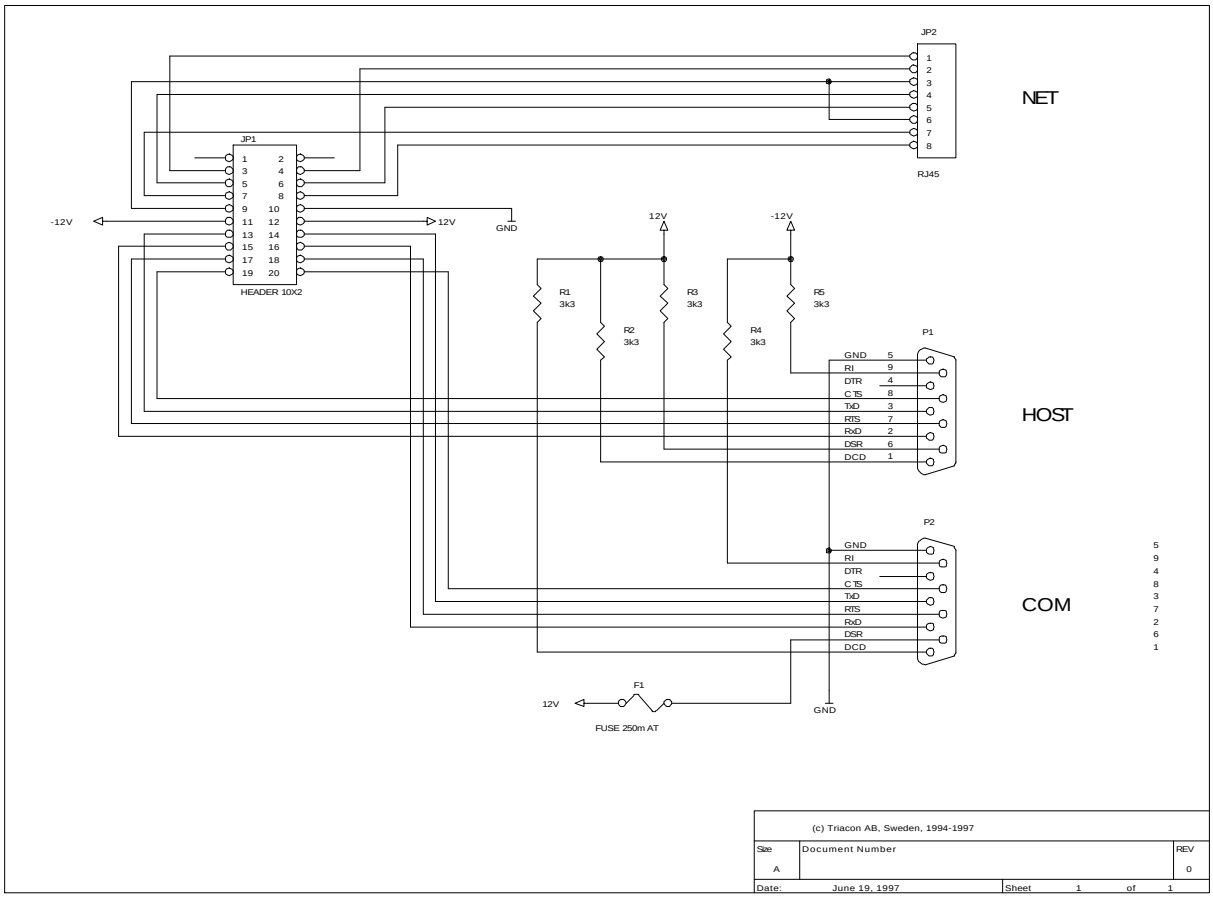
It is available from Kodak as a spare part, part no T801001.

1. Switch off the camera, disconnect it from the mains, and open the case.
2. Remove the cover covering the optics.
3. Check if the grease on the lead screw is still in a good condition. If it is filled with dust the screw and the nut should be cleaned before the new grease is added. Se the assembly/disassembly chapter for instructions on how to assemble and disassemble the opening mechanism assembly if necessary. If more grease needs to be added, it should be spread out along the section where the nut moves. The camera should then be connected to the mains, started and about 20 cassette openings should be performed. Excessive grease that gathers at the right and left stop positions on the screw should be removed. Another 20 openings should be performed and excessive grease removed. This should be repeated until no more grease is gathered. If this is not done properly the excessive grease will be thrown off the screw when the screw is rotating, creating a line of grease on nearby parts.
4. Put everything together and make a test exposure to make sure that everything still works.

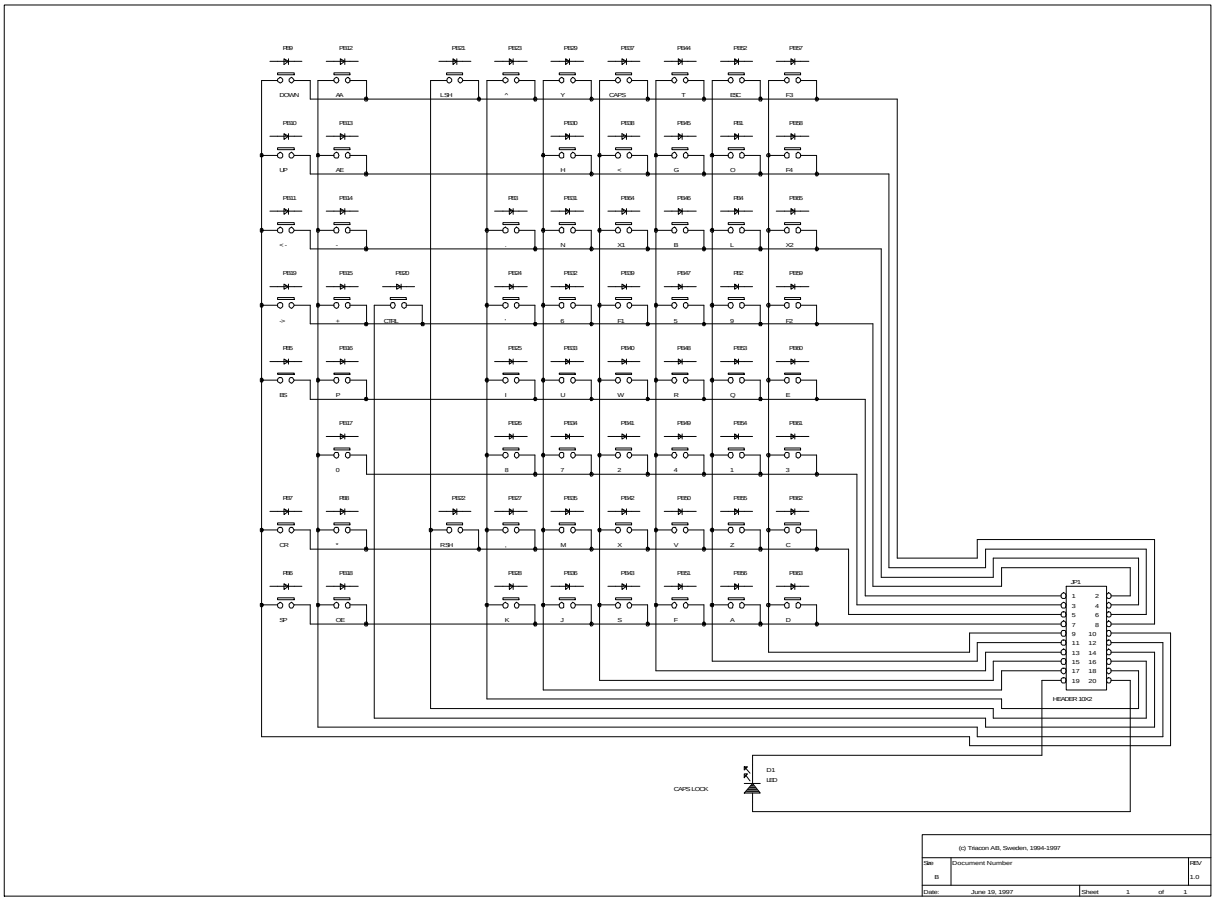
6 Wiring diagram

6.1 Schematics

6.1.1 Adapter board



6.1.2 Keyboard



7 Built in diagnostic software

The KODAK Network ID Camera has built in test functions for cassette sensor adjustment and for testing and adjusting the exposure display. The sensor adjust function is described in the **Sensor adjustment** chapter and will not be repeated here.

7.1 Test functions

The test function is entered by entering the Set-up mode and then selecting Test function. The following window will appear:

```
Test functions
Exposure display                POS    :    0
pattern: NORMAL                 SPEED  :    0
                                RPT CNT:    0
Opening length  : 114           SENSORS:  000
Stop         Previous      Next       Exit
```

There are also a couple of shifted function keys.

```
Adjust       Open         Repeat
Calib
```

All these function have been put as shifted functionkeys since they will cause the camera to operate the motor causing a possible danger for the person operating the camera if the cover is open. Putting them as shifted function keys means that two keys need to be pressed to start the operation.

Function keys

The function keys are used as follows:

`Stop`	Stop the motor.
`Previous`	Select the previous alternative when editing a menu, like the exposure display pattern selection shown in the picture above.
`Next`	Select the next alternative when editing a menu.
`Exit`	Close the test function window.
`Adjust`	Adjust the exposure display. Pressing this key will cause the camera to open a cassette inserted and keep it open until the key is pressed once more. The exposure display will also be switched on. This is very helpful when the picture projected on the film in the cassette needs to be

adjusted. See also the **Adjusting the exposure unit** chapter. Note that the opening is performed regardless of the status of the cassette sensors, that is with or without a cassette inserted.

`Open` Runs an opening cycle exactly as when making an exposure. **NOTE!** The cassette sensors must be activated, that is a cassette must be inserted.

`Repeat` Runs an opening cycle every 2 seconds. **NOTE!** The cassette sensors must be activated, that is a cassette must be inserted. The repeat function is terminated either by pressing the EXIT key or by pressing the Repeat key once more.

`Calibrate` Runs a calibration. The camera is not able to sense when the carriage is in its home position. Instead a calibration cycle is run each time the camera is switched on and at the end of each opening cycle. The calibration cycle means that the motor is run slowly leftwards until the movement is blocked because the carriage hits the left end stop. Then a short movement right followed by yet a left movement (slower this time) until the left end stop is hit again. If the position is the same (with some margins) both time the position is set to 0 and the motor unit is considered calibrated. This operation has to be performed either by using this function or by switching the camera off and on again each time the motor is rotated manually since the camera is not able to keep track of the position. It counts pulses but it is not able to find if the carriage moves left or right.

`Left arrow` The speed of the motor can be set in step of 8 by pressing the left or right arrow keys. Positive speeds are cause movements to the right, negative to the left. The left arrow key will subtract 8 from the speed.

`Right arrow` The speed of the motor can be set in step of 8 by pressing the left or right arrow keys. Positive speeds are cause movements to the right, negative to the left. The left arrow key will add 8 to the speed.

Exposure display pattern.

Here different patterns that will be displayed on the exposure display can be selected.

`Normal` Display the content of the operator display. Note that the exposure display is not switched on until either any of the opening functions described above is performed or until the selection is changed to something else and then back again.

`FRAME C1` Display a three pixel wide frame matching the size of a picture when a cassette with the C1 window is used. This means that the entire area of the exposure display is used.

`FRAME C1N` Display a three pixel wide frame matching the size of a picture when a cassette with the C1N window is used. This means that the entire area of the exposure display except for 16 lines at the top is used.

Opening length.

Here the length of the lid can be set. Normally this is 114 but if a cassette with a lid shorter then normal is used this value can be changed here.

Information on the display

The following information is displayed on the display.

POS	Shows the position of the carriage. Note that the camera is not able to determine the direction of a movement if the motor is run by hand. The pulse count will change but it will increase or decrease (depending on the direction of the last motor movement) regardless of which direction the motor is moved.
SPEED	Tells which speed the motor is running. Positive speed means movement to the right, negative speeds movement to the left. The value is updated once a second.
RPT CNT	Counts the number of opening cycles run by the repeat function of the camera.
SENSORS	Shows the status of the three cassette sensors. A 0 means sensor not activated, 1 means sensor activated. Left digit is left sensor and so on. Updated once a second. For adjustment of the sensors the **Sensor adjustment** window is recommended.

7.2 Serial Analyser

See the **Network Installation Manual** for more information.

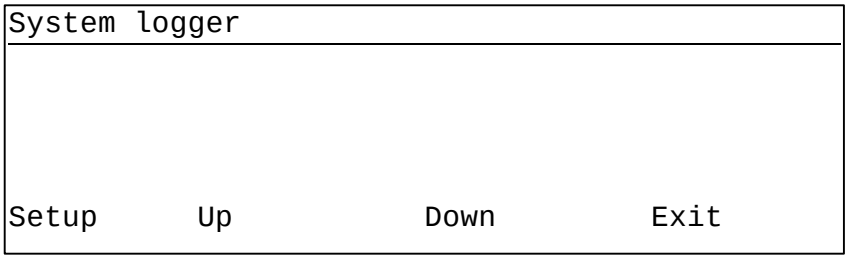
7.3 System logger

The system logger is a 64 record database where the firmware can report errors and abnormal situations which are not reported to the operator or which may be useful for technicians to check afterwards. The logger is never erased unless the ”Erase” button is pressed. Together with the message, date- and timestamp is stored. The format of a record is ”No:Date Time Error”.

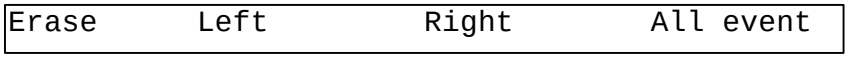
No	index between 00 - 63.
Date	Date when the error occured.
Time	Time when the error occured.
Error	The error message in plain text.

ex. ”00:100499 08:45 Faild to open lid. Pos = 20”.

The errors are divided into four groups; Miscellaneous-, Communication-, Mechanical and Critical errors. The first three can be set to Record/Ignored. The last one is allways active because it handle internal critical errors such as flash memory reset and checksum error in setup memory.



Press shift-key to enable the following functions.



The soft-keys are used as follow.

`Setup` Enter the system logger setup. Possible settings are enable/disable of recording of Miscellaneous-, Communication- and Mechanical errors. If, for example, a communication problem which occur rarely shall be traced it can be a good idee to switch the other records of to avoid that the communication records gets overwritten if the database gets full. This because of the limeted number of records in the list. **NOTE!** Recording of critical errors can not be switch of.

`Up` Scroll the window up.

`Down` Scroll the window down.

`Exit` Exit the system logger.

`Erase` Clear all error messages listed in the system logger. **NOTE!** If the list is erased, the data can not be re-created.

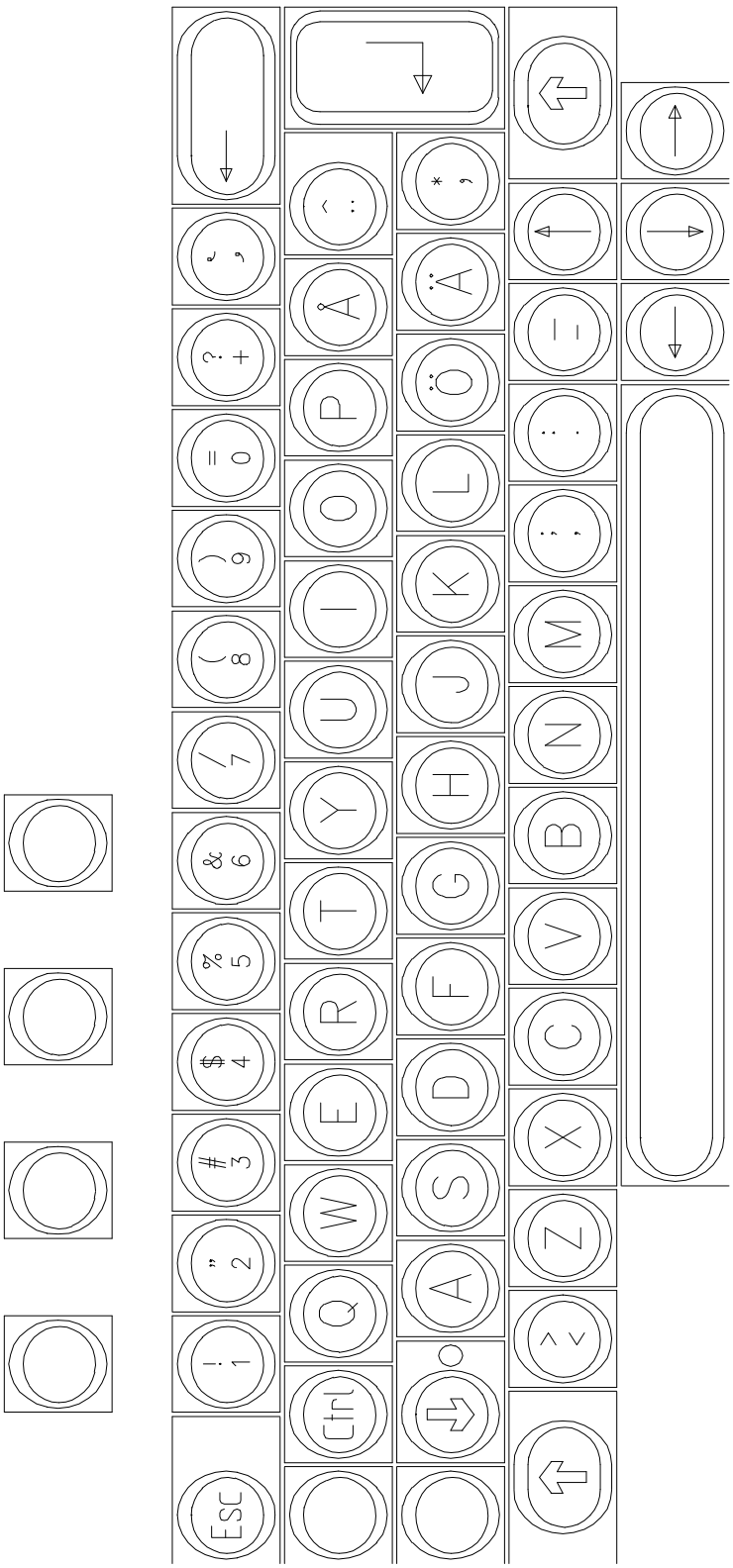
`Left` Scroll the window to the left.

`Rignt` Scroll the window to the right.

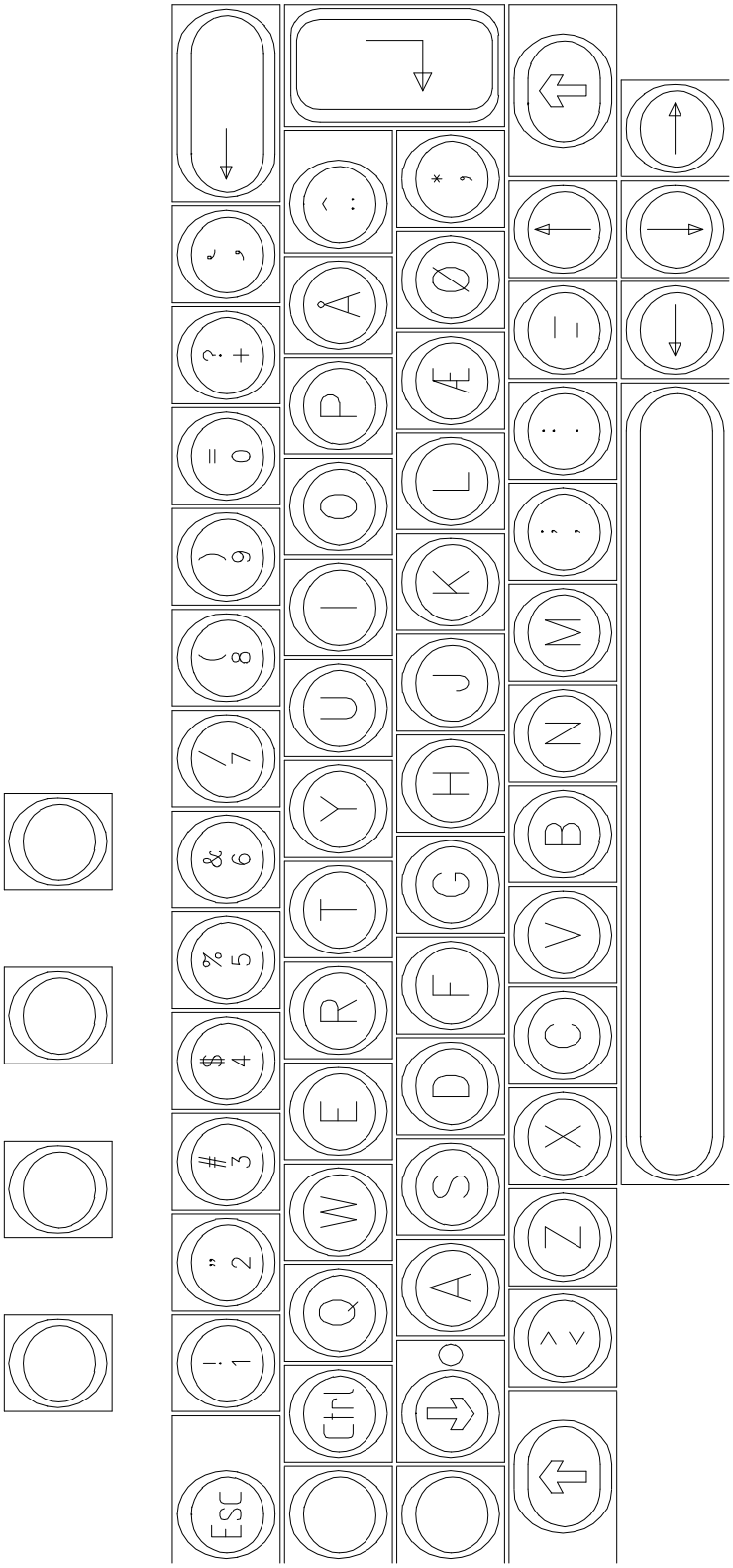
`All event` View all records. This can be used if the database is partly corrupt and you want to view all records even the records which the camera consider being after endmark. Empty records is marked with lines.

Appendix A

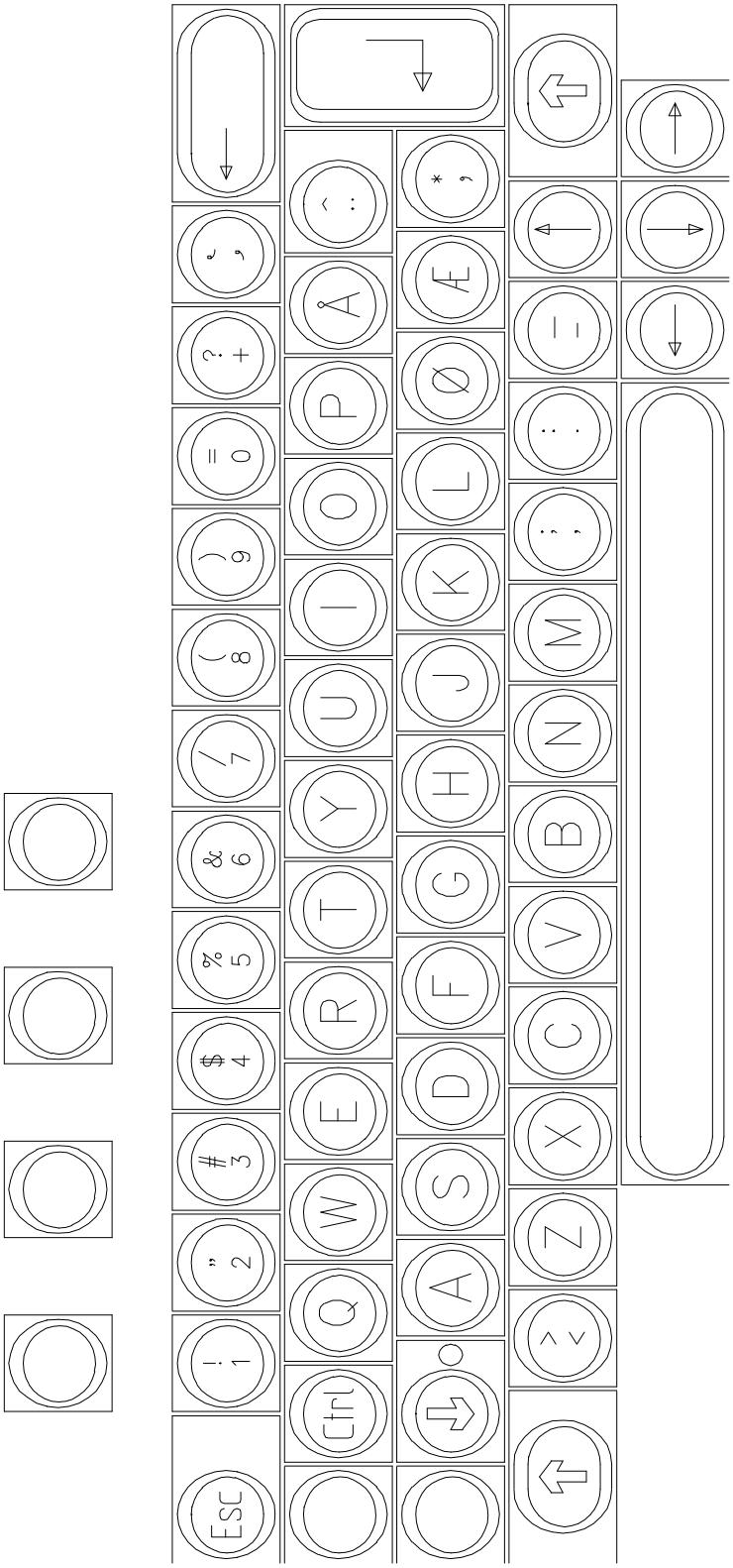
Swedish Keyboard layout



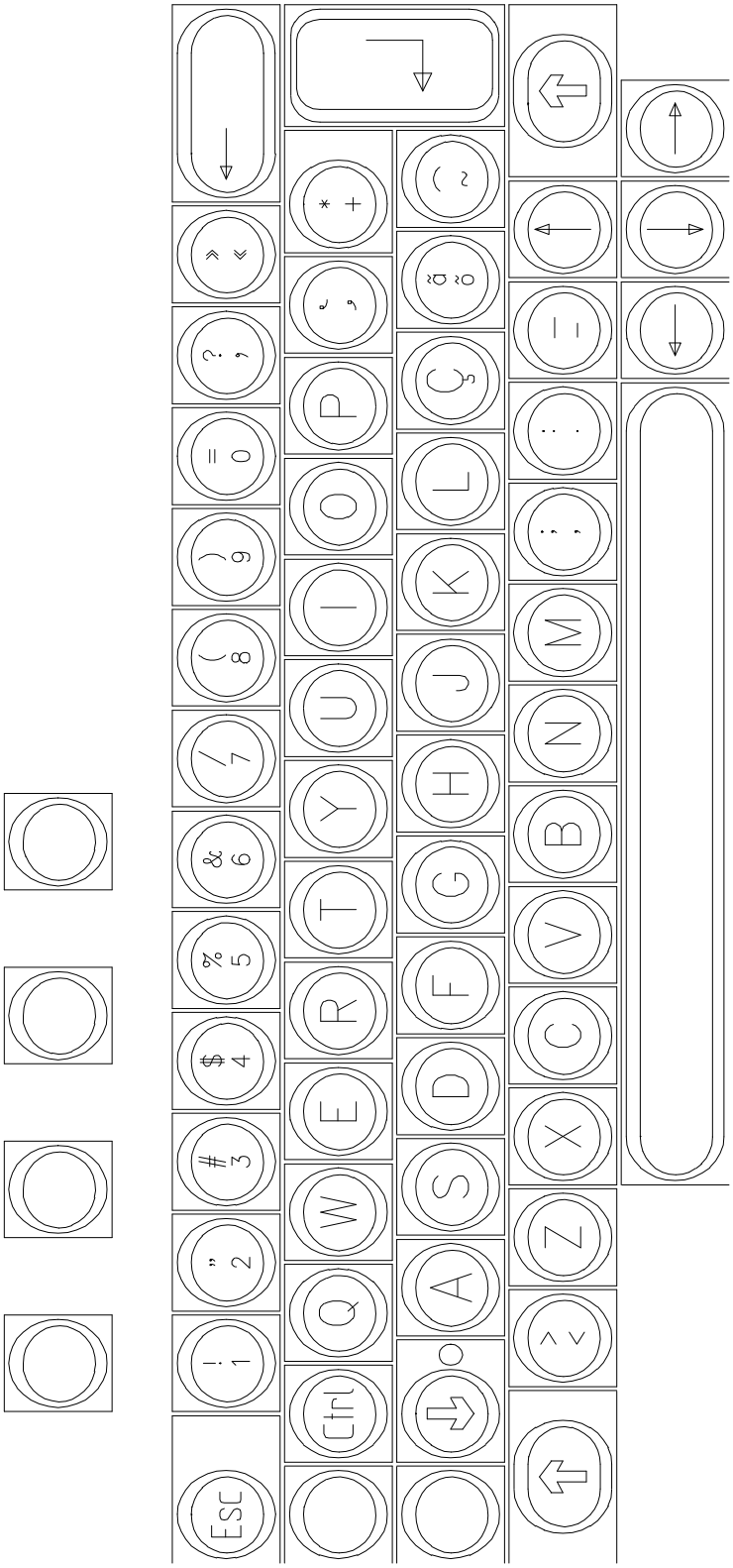
Danish keyboard layout



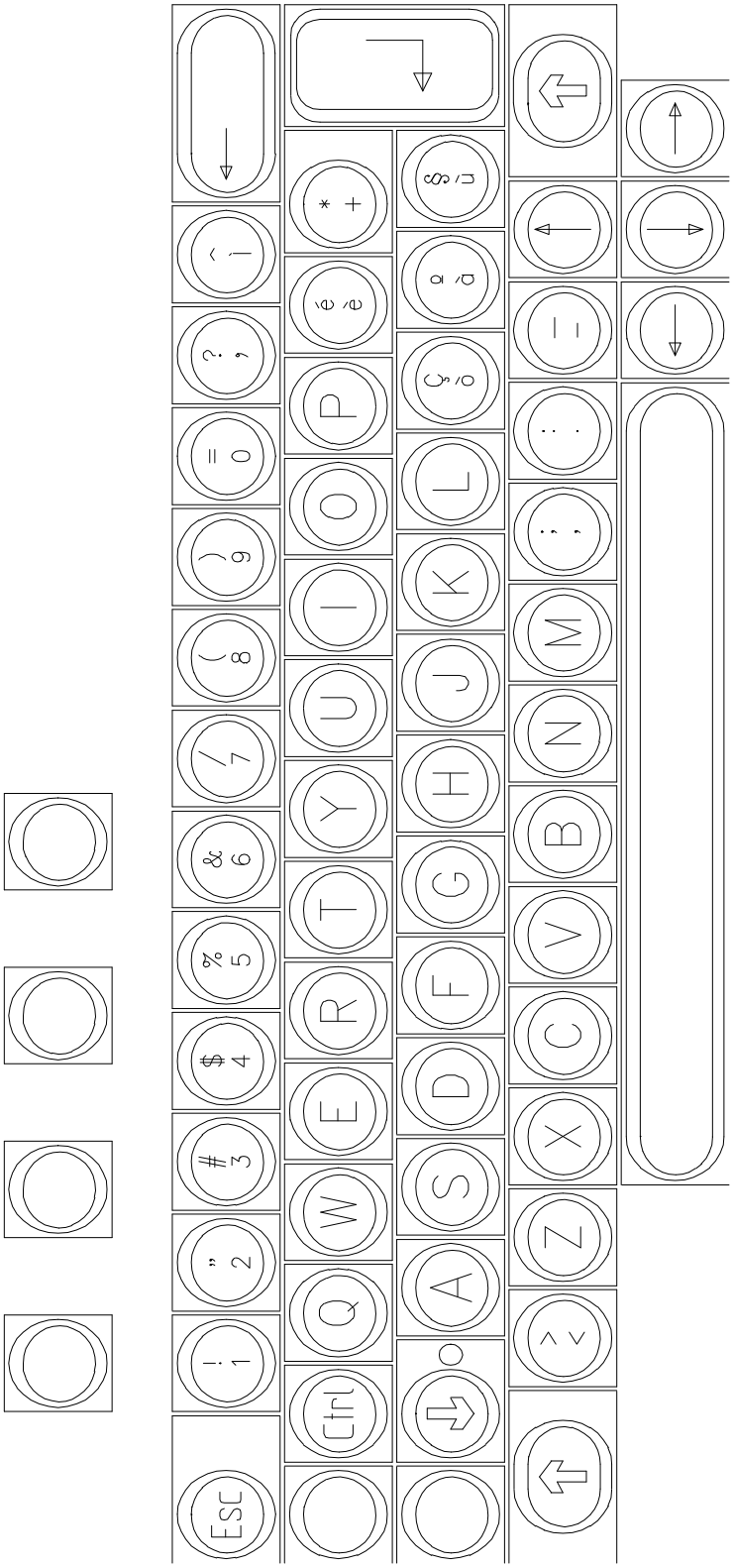
Norwegian keyboard layout



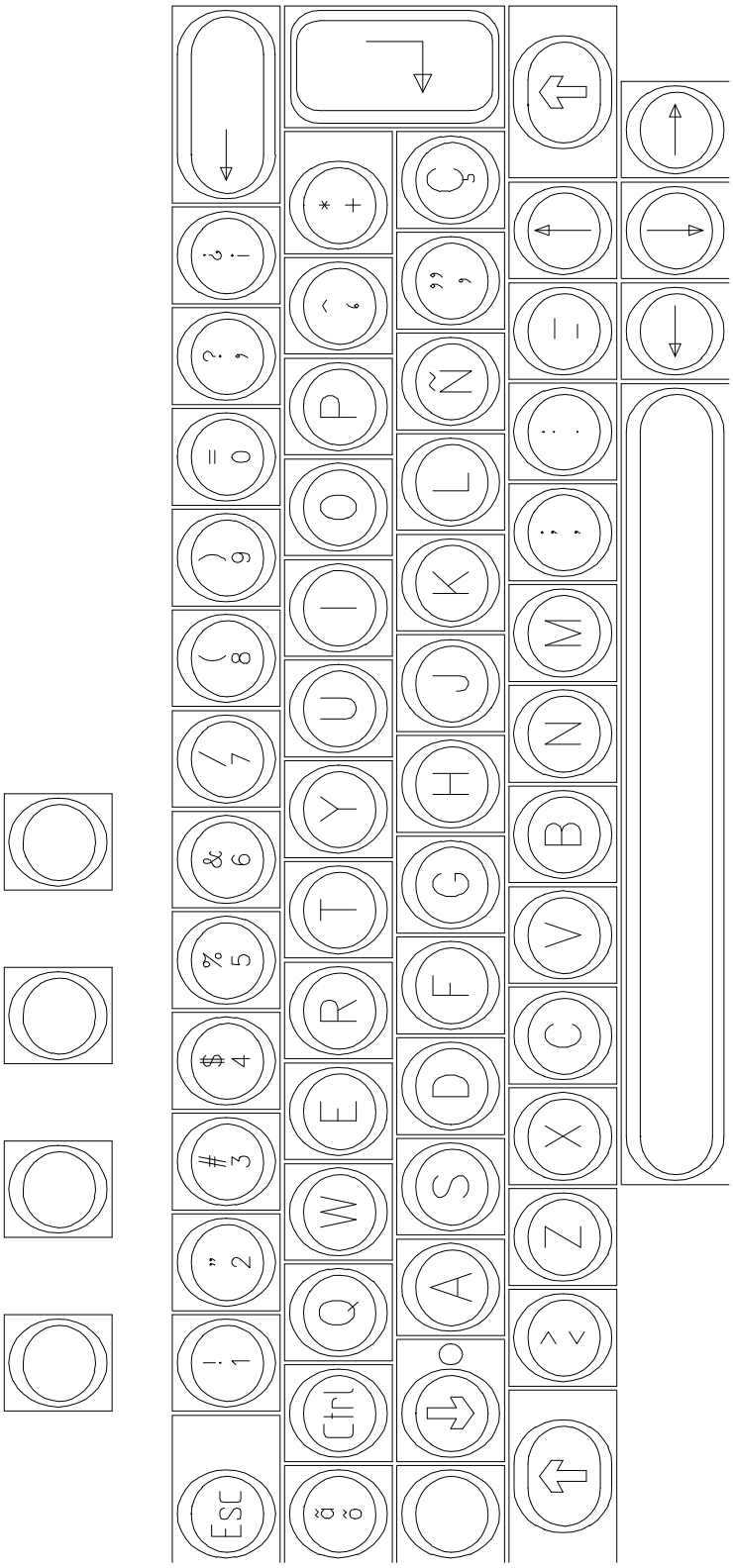
Portugesian keyboard layout



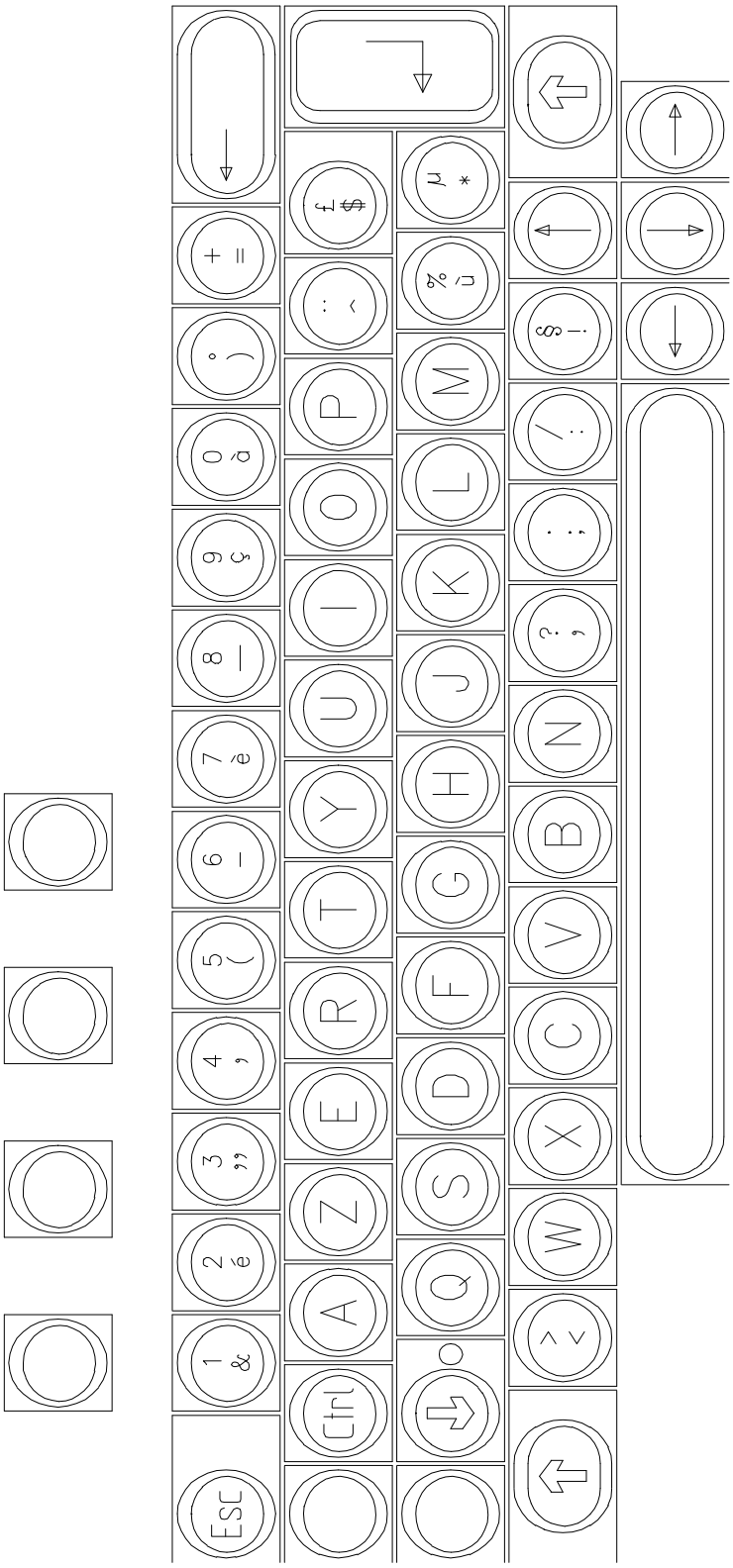
Italian keyboard layout



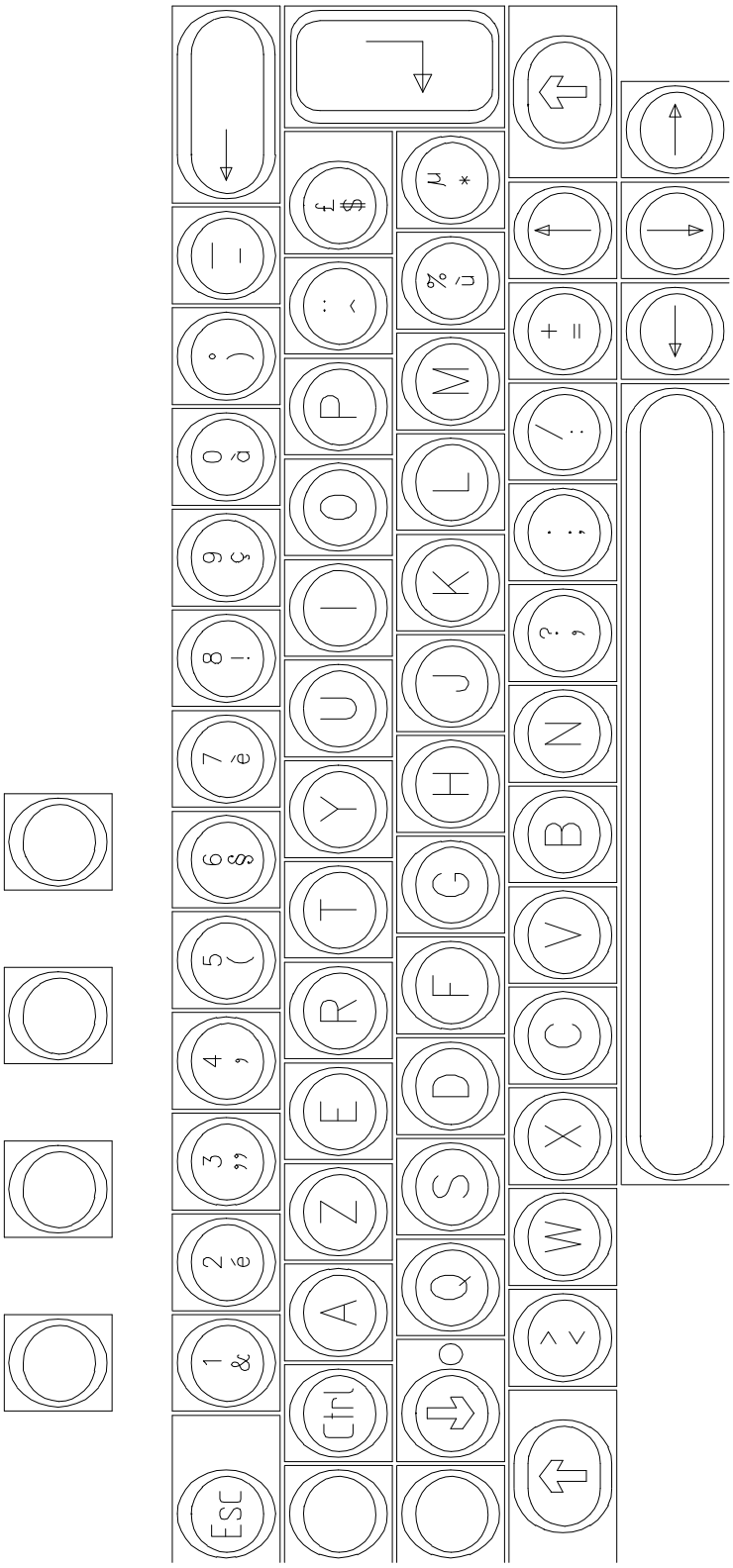
Spanish keyboard layout



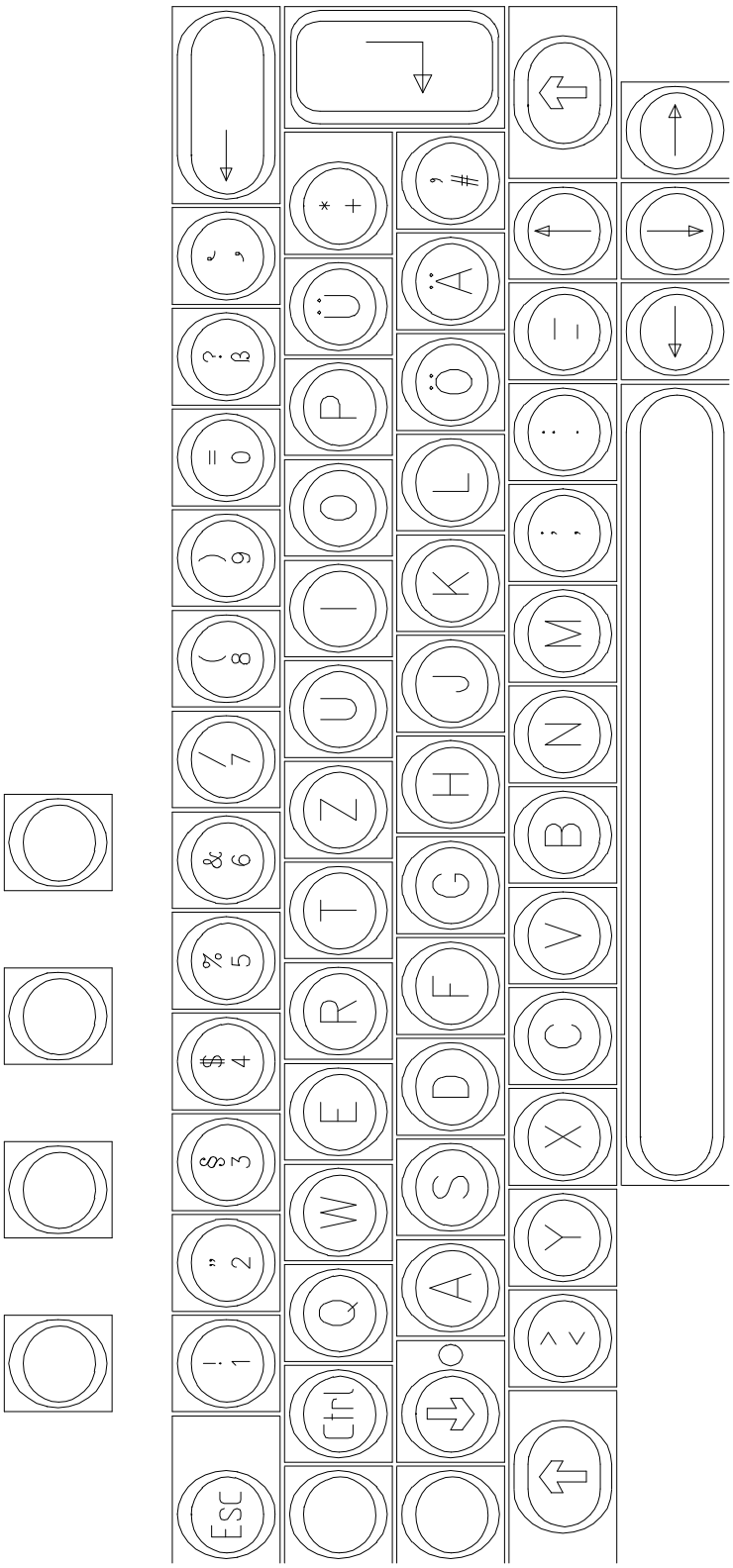
French keyboard layout



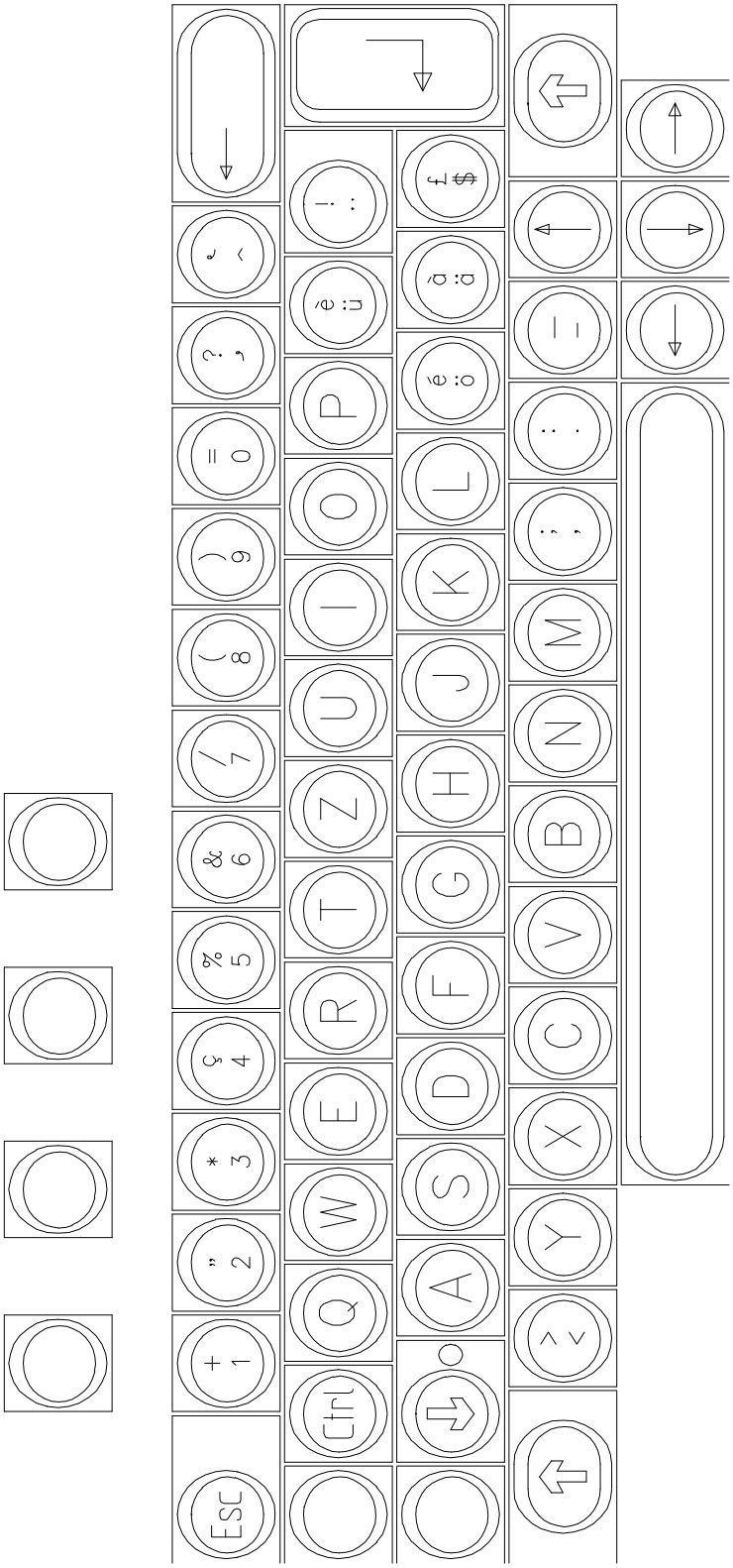
Belgian keyboard layout



German keyboard layout



Swiss keyboard layout



Kodak AG
Hedelfinger Straße
70327 Stuttgart
Germany

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